Access DB# 75441

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Andrew Wessman Examiner #: 78959 Date: 9/11/02
Art Unit: 1742 Phone Number 305-3165 Serial Number: 09/919,392
Mail Box and Bldg/Room Location: CP3 7D12 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

****

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Titanium Having Excellent Impact Resistance and Manufacturing Method

Inventors (please provide full names): See attached sheet

Earliest Priority Filing Date: 7/31/01

For Sequence Searches Only *Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

Please Search composition of claim 1
and hardness and working before forming
of claim 2

****

STAFF USE ONLY

Searcher:	K. Fuller	**Type of Search**		**Vendors and cost where applicable**	
Searcher Phone #:		NA Sequence (#)		STN	✓
Searcher Location:		AA Sequence (#)		Dialog	
Date Searcher Picked Up:		Structure (#)		Questel/Orbit	
Date Completed:	9/17/02	Bibliographic	✓	Dr.Link	
Searcher Prep & Review Time:	30	Litigation		Lexis/Nexis	
Clerical Prep Time:		Fulltext		Sequence Systems	
Online Time:	79	Patent Family		WWW/Internet	
		Other		Other (specify)	

EIC1700

Search Results

Feedback Form (Optional)

Scientific & Technical Information Center

The search results generated for your recent request are attached. If you have any questions or comments (compliments or complaints) about the scope or the results of the search, please contact *the EIC searcher* who conducted the search *or contact*:

Kathleen Fuller, Team Leader, 308-4290, CP3/4 3D62

Voluntary Results Feedback Form

- *I am an examiner in Workgroup:* ☐ *Example:* 1713

- *Relevant prior art found, search results used as follows:*
  - ☐ 102 rejection
  - ☐ 103 rejection
  - ☐ Cited as being of interest.
  - ☐ Helped examiner better understand the invention.
  - ☐ Helped examiner better understand the state of the art in their technology.

  Types of relevant prior art found:
  - ☐ Foreign Patent(s)
  - ☐ Non-Patent Literature
    (journal articles, conference proceedings, new product announcements etc.)

- *Relevant prior art **not found**:*
  - ☐ Results verified the lack of relevant prior art (helped determine patentability).
  - ☐ Search results were not useful in determining patentability or understanding the invention.

Other Comments:

Drop off completed forms in CP3/4 - 3D62 .

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=> FILE HCAPLUS
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FILE COVERS 1907 - 17 Sep 2002  VOL 137 ISS 12
FILE LAST UPDATED: 16 Sep 2002  (20020916/ED)
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This file contains CAS Registry Numbers for easy and accurate substance identification.

CAS roles have been modified effective December 16, 2001. Please check your SDI profiles to see if they need to be revised. For information on CAS roles, enter HELP ROLES at an arrow prompt or use the CAS Roles thesaurus (/RL field) in this file.

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=> D QUE L60
L3            1 SEA FILE=REGISTRY ABB=ON  7440-32-6/BI
L4            1 SEA FILE=REGISTRY ABB=ON  TITANIUM/CN
L5            1 SEA FILE=REGISTRY ABB=ON  L3 OR L4
L6       484149 SEA FILE=HCAPLUS ABB=ON  L5 OR TI OR TITANIUM
L7         2019 SEA FILE=HCAPLUS ABB=ON  L6 AND IMPACT?(3A)RESIST?
L8           35 SEA FILE=HCAPLUS ABB=ON  L7 AND (VICKER? HARD? OR HV)
L9        36021 SEA FILE=HCAPLUS ABB=ON  L6(L)TEM/RL
L10           4 SEA FILE=HCAPLUS ABB=ON  L8 AND L9
L11          15 SEA FILE=HCAPLUS ABB=ON  L8 AND NONFERROUS/SC
L12           6 SEA FILE=HCAPLUS ABB=ON  (L10 OR L11) AND L5
L14         134 SEA FILE=HCAPLUS ABB=ON  L6(5A)IMPACT?(2A)RESIST?
L15           2 SEA FILE=HCAPLUS ABB=ON  L8 AND L14
L16       12647 SEA FILE=HCAPLUS ABB=ON  L6(5A)COMPOSITE?
L17           2 SEA FILE=HCAPLUS ABB=ON  L8 AND L16
L18           8 SEA FILE=HCAPLUS ABB=ON  L12 OR L15 OR L17
L32         176 SEA FILE=HCAPLUS ABB=ON  L6 AND IMPACT? AND (VICKER? HARD? OR
                HV)
L33          60 SEA FILE=HCAPLUS ABB=ON  L32 AND NONFERROUS/SC
L34          11 SEA FILE=HCAPLUS ABB=ON  L33 AND L5
L35           4 SEA FILE=HCAPLUS ABB=ON  (L18 OR L34) NOT (TIC OR TIN OR (TI
                OR TITANIUM)(W)(NITRIDE OR CARBIDE) OR STEEL#)
L36           1 SEA FILE=HCAPLUS ABB=ON  L16 AND L34
L37           4 SEA FILE=HCAPLUS ABB=ON  L35 OR L36
L56        1276 SEA FILE=REGISTRY ABB=ON  99-99.5 TI/MAC
L57        2734 SEA FILE=HCAPLUS ABB=ON  L56
L58          21 SEA FILE=HCAPLUS ABB=ON  L57 AND (VICKER? HARD? OR HV)
L60          25 SEA FILE=HCAPLUS ABB=ON  L37 OR L58
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=> FILE WPIX
FILE 'WPIX' ENTERED AT 11:07:52 ON 17 SEP 2002
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FILE LAST UPDATED: 16 SEP 2002              <20020916/UP>
MOST RECENT DERWENT UPDATE           200259   <200259/DW>
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

>>> SLART (Simultaneous Left and Right Truncation) is now
    available in the /ABEX field. An additional search field
    /BIX is also provided which comprises both /BI and /ABEX <<<

>>> The BATCH option for structure searches has been
    enabled in WPINDEX/WPIDS and WPIX  <<<

>>> PATENT IMAGES AVAILABLE FOR PRINT AND DISPLAY <<<

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=> D QUE L69
L20           37 SEA FILE=WPIX ABB=ON  (TI OR TITANIUM)(4A)IMPACT?(2A)RESIST?
L21            1 SEA FILE=WPIX ABB=ON  L20 AND (VICKER? HARD? OR HV)
L23        46801 SEA FILE=JICST-EPLUS ABB=ON  (TI OR TITANIUM)
L24          311 SEA FILE=JICST-EPLUS ABB=ON  L23 AND (VICKER? HARD? OR HV)
L27           63 SEA FILE=WPIX ABB=ON  L24 AND IMPACT?
L28            1 SEA FILE=WPIX ABB=ON  L27 AND C22C014?/IC
L29            1 SEA FILE=WPIX ABB=ON  L27 AND B21D001?/IC
L30            1 SEA FILE=WPIX ABB=ON  L27 AND C22F001?/IC
L31            1 SEA FILE=WPIX ABB=ON  L21 OR (L28 OR L29 OR L30)
L62          138 SEA FILE=NTIS ABB=ON  (TI OR TITANIUM)(W)METAL
L65            7 SEA FILE=WPIX ABB=ON  L62 AND (VICKER? OR HV)
L68            1 SEA FILE=WPIX ABB=ON  L65 AND (C22C014?/IC OR B21D001?/IC OR
               C22F001?/IC)
L69            2 SEA FILE=WPIX ABB=ON  L31 OR L68

=> FILE JAPIO
FILE 'JAPIO' ENTERED AT 11:08:07 ON 17 SEP 2002
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FILE LAST RELOADED: 25 AUG 2002
FILE COVERS APR 1973 TO MAY 31, 2002

>>> JAPIO has been reloaded on August 25 and saved answer sets
    will no longer be valid.  SEE HELP RLO for details  <<<

=> D QUE L71
L20           37 SEA FILE=WPIX ABB=ON  (TI OR TITANIUM)(4A)IMPACT?(2A)RESIST?
L22            0 SEA FILE=JICST-EPLUS ABB=ON  L20 AND (VICKER? HARD? OR HV)
L23        46801 SEA FILE=JICST-EPLUS ABB=ON  (TI OR TITANIUM)
L24          311 SEA FILE=JICST-EPLUS ABB=ON  L23 AND (VICKER? HARD? OR HV)
L25            6 SEA FILE=JICST-EPLUS ABB=ON  L24 AND IMPACT?
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L38            24 SEA FILE=JAPIO ABB=ON  L22 OR L25
L39             1 SEA FILE=JAPIO ABB=ON  L38 AND C22C014?/IC
L40             1 SEA FILE=JAPIO ABB=ON  L38 AND C22F001?/IC
L41             1 SEA FILE=JAPIO ABB=ON  L38 AND B21D001?/IC
L42             1 SEA FILE=JAPIO ABB=ON  (L39 OR L40 OR L41)
L62           138 SEA FILE=NTIS ABB=ON  (TI OR TITANIUM)(W)METAL
L65             7 SEA FILE=WPIX ABB=ON  L62 AND (VICKER? OR HV)
L70             1 SEA FILE=JAPIO ABB=ON  L65 AND (C22C014?/IC OR B21D001?/IC OR
                  C22F001?/IC)
L71             2 SEA FILE=JAPIO ABB=ON  L42 OR L70
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=> FILE METADEX
FILE 'METADEX' ENTERED AT 11:08:21 ON 17 SEP 2002
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FILE LAST UPDATED: 11 SEP 2002      &lt;20020911/UP&gt;
FILE COVERS 1966 TO DATE.

=> D QUE L54
L46         27539 SEA FILE=METADEX ABB=ON  TITANIUM/CT
L47           600 SEA FILE=METADEX ABB=ON  L46 AND IMPACT?
L49         35732 SEA FILE=METADEX ABB=ON  TITANIUM BASE ALLOYS+NT/CT
L50           986 SEA FILE=METADEX ABB=ON  L49 AND IMPACT?
L51             3 SEA FILE=METADEX ABB=ON  L47 AND (HV OR VICKER? HARD?)
L52             4 SEA FILE=METADEX ABB=ON  L50 AND (HV OR VICKER? HARD?)
L53             5 SEA FILE=METADEX ABB=ON  (L46 OR L49) AND WORK? AND BEFORE?(2A)
                  FORM?
L54            12 SEA FILE=METADEX ABB=ON  (L51 OR L52 OR L53)

=> FILE JICST
FILE 'JICST-EPLUS' ENTERED AT 11:08:38 ON 17 SEP 2002
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TERM (/CT) THESAURUS RELOAD.

=> D QUE L26
L20            37 SEA FILE=WPIX ABB=ON  (TI OR TITANIUM)(4A)IMPACT?(2A)RESIST?
L22             0 SEA FILE=JICST-EPLUS ABB=ON  L20 AND (VICKER? HARD? OR HV)
L23         46801 SEA FILE=JICST-EPLUS ABB=ON  (TI OR TITANIUM)
L24           311 SEA FILE=JICST-EPLUS ABB=ON  L23 AND (VICKER? HARD? OR HV)
L25             6 SEA FILE=JICST-EPLUS ABB=ON  L24 AND IMPACT?
L26             6 SEA FILE=JICST-EPLUS ABB=ON  L22 OR L25

=> DUP REM L60 L69 L71 L54 L26
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FILE 'JAPIO' ENTERED AT 11:09:01 ON 17 SEP 2002
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FILE 'METADEX' ENTERED AT 11:09:01 ON 17 SEP 2002

FILE 'JICST-EPLUS' ENTERED AT 11:09:01 ON 17 SEP 2002

PROCESSING COMPLETED FOR L60
PROCESSING COMPLETED FOR L69
PROCESSING COMPLETED FOR L71
PROCESSING COMPLETED FOR L54
PROCESSING COMPLETED FOR L26
L72 45 DUP REM L60 L69 L71 L54 L26 (2 DUPLICATES REMOVED)

=> D L72 ALL 1-45 HITSTR

L72 ANSWER 1 OF 45 HCAPLUS COPYRIGHT 2002 ACS DUPLICATE 1
AN 2001:707371 HCAPLUS
DN 135:276379
TI **Impact-resistant titanium composite** not containing aluminum, molybdenum, nor vanadium and method for manufacture thereof
IN Takahashi, Kazuhiro; Masaki, Motomi; Miura, Kazuyuki; Oya, Tatsuo
PA Nippon Steel Corp., Japan; Nippon MIC K. K.
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF

applicants

DT Patent
LA Japanese
IC ICM C22C014-00
ICS B21D001-05; C22F001-18; C22F001-00
CC 56-3 (**Nonferrous** Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001262257	A2	20010926	JP 2000-74405	20000316

AB The **titanium composite** consists of; 0.04-0.27 % of total concn. (S) of O, N, and C; .ltoreq.1 % Fe; and the rest of **Ti** and impurities and treated to have the **Vickers hardness** (**Hv***) of the cross-section area satisfying the following equations: for 0.04.ltoreq.S.ltoreq.0.09, 150.ltoreq.**Hv** *.ltoreq.400XS+175; for 0.09.ltoreq.S.ltoreq.0.20, 510XS.ltoreq.+104.ltoreq.**Hv***.ltoreq.400XS+175; and for 0.20.ltoreq.S.ltoreq.0.27, 510XS+104.ltoreq.**Hv***.ltoreq.255 where S = [O]+[N]+[C]. The **titanium composite** shows the good **impact resistance** and is produced in low cost.
ST **impact resistant titanium composite** aluminum molybdenum vanadium manuf
IT **Impact** strength
(**impact-resistant titanium** not contg. aluminum, molybdenum, or vanadium and method for manuf. thereof)
IT **Composites**
(**titanium; impact-resistant titanium** not contg. aluminum, molybdenum, or vanadium and method for manuf. thereof)
IT **7440-32-6, Titanium,** uses
RL: **TEM (Technical or engineered material use)**; USES (Uses)
(main component of **titanium composite**)
IT **7440-32-6, Titanium,** uses
RL: **TEM (Technical or engineered material use)**; USES (Uses)
(main component of **titanium composite**)
RN 7440-32-6 HCAPLUS

CN Titanium (8CI, 9CI) (CA INDEX NAME)

Ti

L72 ANSWER 2 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 2001:831169 HCAPLUS
DN 136:23494
TI High-temperature strength and physical properties of technical-grade titanium VT1-0
AU Pishchak, V. K.; Moiseeva, I. V.; Okrainets, P. N.
CS Inst. Metallofiz. im. G. V. Kurdyumova, NAN Ukr., Kiev, 03680, Ukraine
SO Metallofizika i Noveishie Tekhnologii (2001), 23(9), 1243-1257
CODEN: MNTEEU; ISSN: 1024-1809
PB Natsional'na Akademiya Nauk Ukraini, Institut Metalofiziki im. G. V. Kurdyumova
DT Journal
LA Russian
CC 56-12 (Nonferrous Metals and Alloys)
Section cross-reference(s): 65, 76
AB Temp. dependences of hardness **HV**, yield stress .sigma.0.2, and deformation rate at the steady-state creep stage, .vepsiln.y, in tech.-grade titanium VTI-0 were investigated. At temps. above 520.degree.C (0.4Tm), deformation of VT1-0 was shown to be controlled by diffusion processes. At the vicinity of this temp., an abnormal change of enthalpy, elec. resistivity, and elongation of Ti was also obsd. under heating. The strength decrease with increasing temp. and the abnormal change of phys. properties of Ti were assumed to be the result of specific structural characteristics of the crystal lattice of hcp. metals with the c/a axes ratio below the ideal one.
ST titanium high temp strength phys property
IT Hardness (mechanical)
(Vickers; high-temp. strength and phys. properties of tech.-grade titanium VT1-0)
IT Diffusion
(effect on high-temp. strength and phys. properties of tech.-grade titanium VT1-0)
IT Electric resistance
Elongation, mechanical
Enthalpy
Yield strength
(high-temp. strength and phys. properties of tech.-grade titanium VT1-0)
IT Crystal vacancies
(high-temp. strength and phys. properties of tech.-grade titanium VT1-0 in relation to)
IT Activation energy
(steady-state creep; high-temp. strength and phys. properties of tech.-grade titanium VT1-0)
IT Creep
(steady-state, rate; high-temp. strength and phys. properties of tech.-grade titanium VT1-0)
IT **39462-06-1**, VT1-0
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(high-temp. strength and phys. properties of tech.-grade titanium VT1-0)
IT **39462-06-1**, VT1-0

RL: PEP (Physical, engineering or chemical process); PRP (Properties);
PROC (Process)
(high-temp. strength and phys. properties of tech.-grade titanium VT1-0)

RN 39462-06-1 HCAPLUS
CN Titanium alloy, base, Ti 99.4-100,Fe 0-0.30,O 0-0.25,C 0-0.10,N 0-0.03,H 0-0.015 (UNS R50400) (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99.4 - 100	7440-32-6
Fe	0 - 0.30	7439-89-6
O	0 - 0.25	17778-80-2
C	0 - 0.10	7440-44-0
N	0 - 0.03	17778-88-0
H	0 - 0.015	12385-13-6

L72 ANSWER 3 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 2001:332296 HCAPLUS
DN 135:22827
TI Mechanically alloying and high pressure pulsed current sintering of Si added Ti powders
AU Kobayashi, Keizo; Nishino, Toshiyuki; Matsumoto, Akihiro; Ozaki, Kimihiro; Sugiyama, Akira
CS Materials Processing Department, national Industrial Research Institute of Nagoya, AIST, Ministry of International Trade and Industry, Nagoya, 462-8510, Japan
SO Nippon Kinzoku Gakkaishi (2001), 65(3), 179-182
CODEN: NIKGAV; ISSN: 0021-4876
PB Nippon Kinzoku Gakkai
DT Journal
LA Japanese
CC 56-4 (Nonferrous Metals and Alloys)
AB Ti-1Si, Ti-5Si, Ti-10, and Ti-20 at.% Si powders were synthesized by mech. alloying (MA) of pure elemental Ti and Si powders using planetary ball milling for 360 ks. The Si addn. was effective to produce large amt. of Ti-based MA powder without adhesion to the vial wall and the surface of the milling balls. After milling for 360 ks, the amt. of recoverable powder increased with increasing Si content in the MA powder. The formation of an amorphous phase was obsd. at Ti-5 at.% Si and Ti-10 at.% Si powders after 360 ks milling. Ti-10 at.% Si powder prepd. by milling for 360 ks, which consisted of amorphous phase and fine Ti particles, was consolidated using a pulsed current sintering (PCS) app. under a high pressure of 1568 MPa. The compact consolidated at 733 K was almost densified with the retention of non-equil. structure. The Ti-10 at.% Si powder milled for 360 ks with a hardness of 378 **Hv** was suitable for a consolidation under a high pressure with a deformation of powder.
ST titanium silicon mech alloying amorphization sintering
IT Amorphization
(in mech. alloying; mech. alloying and high pressure pulsed current sintering of Si added Ti powders)
IT Mechanical alloying
Sintering
(mech. alloying and high pressure pulsed current sintering of Si added Ti powders)
IT Metallic glasses
RL: PEP (Physical, engineering or chemical process); PRP (Properties);
PROC (Process)

(titanium alloy; mech. alloying and high pressure pulsed current sintering of Si added Ti powders)

IT **55472-19-0**, Silicon 1, titanium 99 (atomic) 80740-44-9, Silicon 20, titanium 80 (atomic) 132322-40-8, Silicon 5, titanium 95 (atomic) 137848-93-2, Silicon 10, titanium 90 (atomic)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(mech. alloying and high pressure pulsed current sintering of Si added Ti powders)

IT **55472-19-0**, Silicon 1, titanium 99 (atomic)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(mech. alloying and high pressure pulsed current sintering of Si added Ti powders)

RN 55472-19-0 HCAPLUS

CN Titanium alloy, base, Ti 99,Si 0.6 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
Si	0.6	7440-21-3

L72 ANSWER 4 OF 45 METADEX COPYRIGHT 2002 CSA

AN 2002(9):61-522 METADEX

TI The influence of development of new technology and materials on resource of gas turbine engines.

AU Kommel, L. (Tallinn Technical University)

SO BALTICA V: Conditions and Life Management for Power Plants; Vol. 1 (2001), 173-184, Graphs, 17 ref.
Technical Research Centre of Finland. Vuorimiehentie 5, P.O. Box 2000, Espoo, 02044, Finland
Conference: BALTICA V, Porvoo, Finland, 6-8 June 2001
ISBN: 951-38-5714-X

DT Conference Article

CY Finland

LA English

AB In gas turbine engines the most loaded details, determining their resource, cost and effectiveness, are blades of the compressor and turbine. For manufacturing blades used heat resisting deformed titanium alloys, nickel base superalloys. In future we can use also lightweight TiAl intermetallic alloys. The equal channels angular pressing (ECAP) is a new technology allowing nanostructure and high strength of materials. The process of electrical upset forging (EUF) allows to increase of fatigue strength and elasticity of material and as result to increases resource of the gas turbine. Using for processing TiAl intermetallic method of impact fused-forging modeling (IFFM) allows to increase their technological, mechanical and operational characteristics. The greatest heat resisting of superalloys on nickel base ensures their monocrystalline structure received by casting method by directed crystallization in vacuum. The changes of structure and properties of metals have been characterized using the optical and electronic microscopes, XRD, EDS, HU and HV methods.

CC 61 Engineering Components and Structures

CT Conference Paper; Gas turbine engines: Materials selection; Nickel base alloys: End uses; Superalloys: End uses; Titanium base alloys: End uses; Intermetallics: End uses; Titanium compounds: End uses; Aluminides: End uses; Equal channel angular pressing; Upsetting; Explosive forming; Intermetallics

ALI TiAl CCA: CPD

ET Al*Ti; Al sy 2; sy 2; Ti sy 2; TiAl; Ti cp; cp; Al cp

L72 ANSWER 5 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 2000:356936 HCAPLUS
DN 133:9154
TI Wear-resistant titanium alloys for prosthetics
IN Suzuki, Akihiro; Okabe, Michio; Taira, Masayuki
PA Daido Steel Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C22C014-00
ICS A61L027-00; A61C013-08
CC 63-7 (Pharmaceuticals)
Section cross-reference(s): 56
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2000144287	A2	20000526	JP 1998-316534	19981106

AB The alloys comprise 0.003-3 wt.% P and Ti and impurities balance. The alloys may contain 0-1 wt.% Fe and/or 0-0.2 wt.% C + N. The alloys may contain .gtoreq.1 selected from Al, Sn, Zr, Ni, Cr, Mo, V, Nb, Ta, Pd, Si at 0-3%. Hardness of Ti alloy contg. 2.9% P was 256 **HV**, vs. 119 **HV** for a control Ti alloy contg. <0.02 wt.% P. Wear of a pin comprising the same alloy was 0.55 mm in a pin-on-disk wear test, vs. 1.27 mm for the control pin.
ST waer resistant prosthetic titanium base alloy phosphorus content
IT Prosthetic materials and Prosthetics
(alloys; wear-resistant Ti alloys contg. controlled amt. of P for prosthetics)
IT Medical goods
(pins; wear-resistant Ti alloys contg. controlled amt. of P for prosthetics)
IT 7429-90-5, Aluminum, biological studies 7439-98-7, Molybdenum, biological studies 7440-02-0, Nickel, biological studies 7440-03-1, Niobium, biological studies 7440-05-3, Palladium, biological studies 7440-21-3, Silicon, biological studies 7440-25-7, Tantalum, biological studies 7440-31-5, Tin, biological studies 7440-47-3, Chromium, biological studies 7440-62-2, Vanadium, biological studies 7440-67-7, Zirconium, biological studies 270577-17-8 270577-18-9 270577-19-0 270577-20-3 **270577-21-4** **270577-22-5** 270577-23-6 270577-24-7 270577-25-8 270577-26-9 270577-27-0 270577-28-1 270577-29-2 270577-30-5 270577-31-6 270577-32-7 270577-33-8 270577-34-9 **270577-35-0** 270577-36-1 270577-37-2 270577-38-3 270577-39-4 270577-40-7 270577-41-8 270577-42-9 270577-43-0
RL: DEV (Device component use); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(wear-resistant Ti alloys contg. controlled amt. of P for prosthetics)
IT **270577-21-4** **270577-22-5** **270577-35-0**
RL: DEV (Device component use); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(wear-resistant Ti alloys contg. controlled amt. of P for prosthetics)
RN 270577-21-4 HCAPLUS
CN Titanium alloy, base, Ti 99,O 0.5,P 0.2 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number

Ti	99	7440-32-6
O	0.5	17778-80-2
P	0.2	7723-14-0

RN 270577-22-5 HCAPLUS
CN Titanium alloy, base, Ti 99,P 0.5,C 0.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
P	0.5	7723-14-0
C	0.1	7440-44-0

RN 270577-35-0 HCAPLUS
CN Titanium alloy, base, Ti 99,P 0.5,O 0.4,Pd 0.2 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
P	0.5	7723-14-0
O	0.4	17778-80-2
Pd	0.2	7440-05-3

L72 ANSWER 6 OF 45 JICST-EPlus COPYRIGHT 2002 JST
AN 1010240993 JICST-EPlus
TI **Impact** tensile property of TiB reinforced **Ti** composite.
AU OSAKO KAZUHISA
TODA HIROYUKI; KOBAYASHI TOSHIRO
CS Toyohashi Univ. of Technol., Grad. Sch.
Toyohashi Univ. of Technol., Fac. of Tech.
SO Nippon Kikai Gakkai Kikai Zairyo, Zairyo Kako Gijutsu Koenkai Koen Ronbunshu, (2000) vol. 8th, pp. 123-124. Journal Code: L1936A (Fig. 4)
CY Japan
DT Conference; Short Communication
LA Japanese
STA New
AB **Titanium**-based metal-matrix composites(MMCs), reinforced with 20vol.% TiB particle is produced by mechanical alloying-spark plasma sintering. The compacting of the sintered shows 98.8% in relative density and about 630Hv. In order to improve the density, hot rolling (reduction ratio of 2.5:1) is conducted. The results show that the **vickers hardness** increases by about 5%, and 99.9% becomes in relative density. The tensile test is conducted under the quasi-static loading, the ultimate tensile strength of 1173MPa exhibiting. However, it breaks during the elastic deformation. Also, as loading rate increases from 101 to 103s-1, the dimple becomes large, and deep. (author abst.)
CC WE04030R (669-492)
CT dispersion hardening alloy; **titanium** base alloy; boron compound; mechanical alloying; electric discharge sintering; hot rolling; **impact** strength; tensile test; strain rate; velocity dependence; fractography; electron microscopy; hardness test; X-ray diffractometry
BT alloy; metallic material; composite material; material; light alloy; nonferrous alloy; 3B group element compound; alloying; modification; sintering; benefication of ore; heat treatment; treatment; ~~rolling(plastic~~ working); plastic working; working and processing; hot working; mechanical property; property; strength; material testing; test; velocity;

dependence; inspection; microscopy; observation and view; X-ray analysis; instrumental analysis; analysis(separation); analysis

L72 ANSWER 7 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1999:326085 HCAPLUS
DN 130:341202
TI Stainless steel coated with intermetallic compound and process for producing the same
IN Yoshida, Hiroaki; Yamada, Hiroshi; Iwane, Fumio; Imai, Junji; Hamada, Tadashi; Fujimoto, Shinji; Yamada, Shuji; Sakon, Shigetoshi
PA Daido Steel Co., Ltd., Japan; Matsushita Electric Works, Ltd.
SO PCT Int. Appl., 45 pp.
CODEN: PIXXD2
DT Patent
LA Japanese
IC ICM C23C010-28
CC 55-6 (Ferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9924633	A1	19990520	WO 1998-JP5082	19981111
	W: CN, DE, GB, JP, US				
	GB 2336376	A1	19991020	GB 1999-16207	19981111
	DE 19882178	T	20000210	DE 1998-19882178	19981111
	US 6194088	B1	20010227	US 1999-331589	19990701
PRAI	JP 1997-329447	A	19971112		
	WO 1998-JP5082	W	19981111		

AB A martensitic stainless steel having a **Vickers hardness** of .gtoreq.400 has a hard adherent coating of an intermetallic compd. having high rigidity, toughness, wear resistance, and corrosion resistance. The coating has the outermost layer of a Ti-Ni intermetallic compd., a Ti-Fe intermetallic compd., or a mixt. of a Ti-Ni intermetallic compd. with a Ti-Cu intermetallic compd. The coated stainless steel is produced by cladding a martensitic stainless steel with Ti or a Ti alloy either directly or through an interlayer made of Ni, Fe, or a Ni-Cu alloy to prep. a laminate, holding this laminate at 900-1150.degree. for 30 s to 5 min, and then cooling at .gtoreq.1.degree./s.
ST titanium iron intermetallic compd coating stainless steel; nickel titanium intermetallic compd coating stainless steel; copper titanium intermetallic compd coating stainless steel
IT Cladding
(stainless steel coated with intermetallic compd. and process for producing the same)
IT Intermetallic compounds
RL: TEM (Technical or engineered material use); USES (Uses)
(stainless steel coated with intermetallic compd. and process for producing the same)
IT **12793-98-5**
RL: TEM (Technical or engineered material use); USES (Uses)
(outermost layer contg.; stainless steel coated with intermetallic compd. and process for producing the same)
IT 12019-24-8 12019-53-3 12019-62-4 12023-04-0, FeTi 12023-40-4 12035-60-8 12035-74-4 12597-68-1, Stainless steel, uses 112850-70-1 196697-53-7 224434-24-6 224434-26-8 224434-29-1 224434-30-4 224434-31-5 224434-32-6 224434-34-8 224434-35-9 224434-37-1 224434-38-2 224434-40-6 224434-42-8 224434-44-0 224434-46-2 224434-48-4
RL: TEM (Technical or engineered material use); USES (Uses)
(stainless steel coated with intermetallic compd. and process for producing the same)

IT 12070-08-5, Titaniumc arbide
RL: TEM (Technical or engineered material use); USES (Uses)
(underlayer; stainless steel coated with intermetallic compd. and process for producing the same)
RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

(1) Mitsubishi Heavy IndustriesLtd; JP 62203687 A 1987 HCAPLUS
(2) Nippon Metal Industry Co Ltd; JP 03115559 A 1991 HCAPLUS
(3) Sumitomo Metal Mining Co Ltd; JP 135918 B 1989

IT **12793-98-5**
RL: TEM (Technical or engineered material use); USES (Uses)
(outermost layer contg.; stainless steel coated with intermetallic compd. and process for producing the same)
RN 12793-98-5 HCAPLUS
CN Titanium alloy, base, Ti 99-100,Fe 0-0.30,Pd 0.12-0.25,O 0-0.25,C 0-0.10,N 0-0.03,H 0-0.015 (UNS R52400) (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99 - 100	7440-32-6
Fe	0 - 0.30	7439-89-6
Pd	0.12 - 0.25	7440-05-3
O	0 - 0.25	17778-80-2
C	0 - 0.10	7440-44-0
N	0 - 0.03	17778-88-0
H	0 - 0.015	12385-13-6

L72 ANSWER 8 OF 45 JICST-EPlus COPYRIGHT 2002 JST
AN 990780351 JICST-EPlus
TI Effect of Pre-Strain on Mechanical Propertiec of Ni-**Ti**-Nb Shape Memory Alloy.
AU OYAMADA OSAMU
AMANO KAZUO; ENOMOTO KUNIO
SHIGENAKA NAOTO
MATSUMOTO JUN
ASADA YASUHIDE
CS Hitachi, Ltd., Hitachi Work.
Hitachi, Ltd., Mech. Eng. Res. Lab.
Hitachi, Ltd.
Tokyo Electr. Power Co.
Univ. of Tokyo, Fac. of Eng.
SO Nippon Kikai Gakkai Ronbunshu. A (Transactions of the Japan Society of Mechanical Engineers. A), (1999) vol. 65, no. 636, pp. 1741-1746. Journal Code: F0227B (Fig. 16, Tbl. 3, Ref. 9)
ISSN: 0387-5008
CY Japan
DT Journal; Article
LA Japanese
STA New
AB A shape memory alloy (SMA) is intended to be used as structural elements at elevated temperatures. The mechanical and transformation properties of Ni-**Ti**-Nb SMA were examined at room temperature and 561 K. The chemical composition of Ni-**Ti**-Nb SMA is 51 wt.% Ni, 38 w.% **Ti** and 11 wt.% Nb. The tensile strength, the 0.2% proof stress and the **vickers hardness** are increasing with increasing prestrain below 14%, but the elongation, the reduction of area and the charpy **impact** absorption are decreasing with increasing pre-strain below 14%. The SMA is found to have sufficient mechanical

strength for structural elements at elevated temperature. Maximum recovery strain due to the shape memory effect was about 5.5%. This value was obtained when 12% pre-strain was added. This means that a pre-strain of 12% is desirable when the Ni-**Ti**-Nb SMA is used for pipe coupling, etc. (author abst.)

CC HB02020U; WB01040Y (620.17:669; 669.017:620.18+)

CT shape memory alloy; shape memory effect; prestrain; nickel base alloy; **titanium** containing alloy; niobium containing alloy; material testing; power plant; pipe joint; fractography; work hardening; electron microscopy; strain recovery; fracture toughness; ductile fracture

BT alloy; metallic material; effect; strain; nonferrous alloy; containing alloy; test; electric power facility; joint(tool); pipe fitting(material); inspection; hardening; microscopy; observation and view; restoration; mechanical property; property; toughness; fracture

L72 ANSWER 9 OF 45 METADEX COPYRIGHT 2002 CSA

AN 1999(12):22-1303 METADEX

TI Dynamic indentation hardness and rate sensitivity in metals.

AU Subhash, G. (Michigan Technological University); Koeppel, B.J. (Michigan Technological University); Chandra, A. (Michigan Technological University)

SO Journal of Engineering Materials and Technology (Transactions of the ASME) (1999) 121, (3), 257-263, Graphs, 39 ref.
ISSN: 0094-4289

DT Journal

CY United States

LA English

AB An experimental technique for determining the dynamic indentation hardness of materials is described. Unlike the traditional static hardness measurements, the dynamic hardness measurements can capture the inherent rate dependent material response that is germane to high strain rate processes such as high speed machining and impact. The dynamic Vickers hardness (DHV) of several commonly used engineering materials is found to be greater than the static Vickers hardness (HV). The relationship between the hardness and yield stress under static conditions, i.e., HV = 3 sigma y, is also found to be valid under dynamic conditions. It is suggested that this simpler technique can be used to assess the rate sensitive nature of engineering materials at moderate strain rates in the range of around 2000/s. (Example materials include aluminum alloys 2023 and 6061, Monel, stainless steel 316, and titanium alloy Ti-6Al-4V, among others.)

CC 22 Testing and Control; 31 Mechanical Properties

CT Journal Article; Nickel base alloys: Mechanical properties; Austenitic stainless steels: Mechanical properties; Titanium base alloys: Mechanical properties; Aluminum base alloys: Mechanical properties; Hardness tests; Indentation; Strain rate; Live loads; Yield strength; Diamond pyramid hardness

ALI Monel CCA: NI; 316 CCA: SSA; Ti-6Al-4V CCA: TI; 2024 CCA: AL; 6061 CCA: AL

ET Al*Ti*V; Al sy 3; sy 3; Ti sy 3; V sy 3; Ti-6Al-4V; I*T; TI; T cp; cp; I cp

L72 ANSWER 10 OF 45 HCAPLUS COPYRIGHT 2002 ACS

AN 1999:455866 HCAPLUS

DN 131:217400

TI Addition of ceramic particles to TIG melted titanium surfaces

AU Mridha, S.; Ng, B. S.

CS School of Applied Science, Nanyang Technological University, Singapore, 639798, Singapore

SO Surface Engineering (1999), 15(3), 210-215
CODEN: SUENET; ISSN: 0267-0844

PB Institute of Materials

DT Journal

LA English
CC 56-6 (Nonferrous Metals and Alloys)
AB A surface layer metal matrix composite was developed by using a tungsten inert gas (TIG) arc with an operating current of 60 A. The 0.5 mm thick coating of a powder mixt. contg. 80 vol.-% titanium and 20 vol.-% 40 .mu.m SiCp particles was preplaced on com. pure titanium surfaces using a suitable binder. The powder coating was then melted by traversing specimens beneath a Miller TIG arc using 110, 90, 55, and 45 MJ m-2 energy densities. Glazing at energy densities from 55 to 110 MJ m-2 completely dissolved the powder mixt. and produced 1 mm deep hard (500 to 600 **HV**) layers which were free from pores, cracks, and cavities. The tracks had smooth and reflective surfaces. The microstructure developed in the tracks is dominated by the reaction of SiCp particles with the molten titanium layer to form titanium carbide (dendrites), Ti5Si3, and titanium. Processing with 45 MJ m-2 energy d. arc produced pores and cavities in the melt pool; the microstructure consisted of agglomerated and partially dissolved SiCp, fine dendrites, and globular particles with hardness ranging from 800 to 1600 **HV** over a 500 .mu.m thickness.
ST metal matrix composite titanium alloy surface treatment
IT Ceramic coatings
Metal matrix composites
(addn. of ceramic particles to TIG arc melted titanium and titanium alloy surfaces)
IT Coating process
Dendrites (crystal)
Microstructure
Scanning electron microscopy
Surface structure
X-ray diffraction
(titanium carbide dendrites in addn. of ceramic particles to TIG arc melted titanium and titanium)
IT 7440-32-6, Titanium, processes **37246-34-7**, IMI115
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(addn. of ceramic particles to TIG arc melted titanium and titanium alloy surfaces)
IT 409-21-2, Silicon carbide (SiC), uses 12070-08-5, Titanium carbide
RL: MOA (Modifier or additive use); USES (Uses)
(titanium carbide dendrites in addn. of ceramic particles to TIG arc melted titanium and titanium)
RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Abboud, J; J Mater Sci Lett 1991, V10, P1149 HCAPLUS
(2) Ashby, M; Acta Metall 1984, V32, P1935 HCAPLUS
(3) Ayers, J; J Met 1981, V33, P19 HCAPLUS
(4) Ayers, J; Lasers in metallurgy 1981, P115 HCAPLUS
(5) Ayers, J; Wear 1984, V93, P193 HCAPLUS
(6) Baker, T; Mater Sci Technol 1994, V10, P536 HCAPLUS
(7) Hu, C; J Mater Process Technol 1996, V58, P87
(8) Khan, T; Surf Eng 1997, V13, P257 HCAPLUS
(9) Mridha, S; Proc 6th Int Conf on Processing and Fabrication of Advanced Materials 1998, P1331 HCAPLUS
(10) Mridha, S; Surf Eng 1997, V13, P233 HCAPLUS
(11) Mridha, S; Titanium '92: science and technology 1993, P2641 HCAPLUS
IT **37246-34-7**, IMI115
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(addn. of ceramic particles to TIG arc melted titanium and titanium alloy surfaces)
RN 37246-34-7 HCAPLUS

CN Titanium alloy, base, Ti 99.5-100,Fe 0-0.20,O 0-0.18,C 0-0.10,N 0-0.03,H 0-0.015 (UNS R50250) (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99.5 - 100	7440-32-6
Fe	0 - 0.20	7439-89-6
O	0 - 0.18	17778-80-2
C	0 - 0.10	7440-44-0
N	0 - 0.03	17778-88-0
H	0 - 0.015	12385-13-6

L72 ANSWER 11 OF 45 METADEX COPYRIGHT 2002 CSA DUPLICATE 2
AN 1999(5):31-2415 METADEX
TI Mechanical properties of Zr-Ti-Al-Ni-Cu bulk amorphous sheets prepared by squeeze casting.
AU Zhang, T. (Tohoku University); Inoue, A. (Tohoku University)
SO Materials Transactions, JIM (Dec. 1998) 39, (12), 1230-1237, Graphs, Photomicrographs, 33 ref.
ISSN: 0916-1821
DT Journal
CY Japan
LA English
AB Tensile fracture strength (sigma f) and Vickers hardness (Hv) of Zr-Al-Ni-cu amorphous sheets with a thickness of 2.5 mm prepared by squeeze casting were found to increase by the addition of 2.5-5 t.% Ti and the increase of Al content to 12.5-15 at.%. The sigma f and Hv of the amorphous alloy sheets with the new compositions are 1800-1850 MPa and 500-520, respectively, which are higher than those (sigma f=1650-1790 MPa and Hv=470-480) for the Zr-10% Al-Ni-Cu amorphous cylinders prepared by copper mold casting. The Young's modulus, elastic elongation and Charpy impact fracture energy are 86-92 GPa, 2.0-2.2% and 90-160 kJ/m 2, respectively. The highest value of the three point-bending flexural strength is 3900 MPa for Zr55Al15Ni10Cu20. The high impact fracture energy indicates that the cast amorphous alloy sheets have good ductility. Furthermore, the improvement of sigma f and Hv by the simultaneous addition of Ti and Al is presumably due to the increase of the bonding force of the constitutent elements resulting from the increase of Zr-Al and Ti-Al pairs with larger negative heats of mixing. The synthesis of the high Al concentration Zr-Al-Ni-Cu and Zr-Ti-Al-Ni-Cu amorphous alloys with higher mechanical strength, higher impact fracture energy and lower density is important for the future progess of high-strength bulk amorphous alloys because the Zr-Al-Ni-Cu amorphous alloys with the 10 at.% Al concentration have already been used as new engineering materials.
CC 31 Mechanical Properties
CT Journal Article; Zirconium base alloys: Mechanical properties; Titanium: Alloying elements; Aluminum: Alloying elements; Nickel: Alloying elements; Copper: Alloying elements; Metallic glasses: Mechanical properties; Fracture strength: Alloying effects; Bend strength: Alloying elements; Ductility: Alloying elements
ET Al*Cu*Ni*Ti*Zr; Al sy 5; sy 5; Cu sy 5; Ni sy 5; Ti sy 5; Zr sy 5; Zr-Ti-Al-Ni-Cu; Al*Ni*Zr; Al sy 3; sy 3; Ni sy 3; Zr sy 3; Zr-Al-Ni; Ti; Al; Zr; Al*Cu*Ni; Cu sy 3; Al-Ni-Cu; Al*Cu*Ni*Zr; Al sy 4; sy 4; Cu sy 4; Ni sy 4; Zr sy 4; Zr55Al15Ni10Cu20; Zr cp; cp; Al cp; Ni cp; Cu cp; Al*Zr; Al sy 2; sy 2; Zr sy 2; Zr-Al; Al*Ti; Ti sy 2; Ti-Al; Zr-Al-Ni-Cu

L72 ANSWER 12 OF 45 METADEX COPYRIGHT 2002 CSA
AN 1999(1):58-82 METADEX

TI Nickel electroforming for the blade protector of helicopter.
AU Yoshino, K. (Katsukawa Micarome Industries Ltd.)
SO Hyomen Gijutsu (Journal of the Surface Finishing Society of Japan) (1998) 49, (2), 161-163, Photomicrographs, 2 ref.
ISSN: 0915-1869
DT Journal
CY Japan
LA Japanese
AB The helicopter rotor blade is made from aluminum alloy or FRP. The blade edge is attached at the edge of rotor blade to protect against impact of sand and dust particles during landing and take off of the aircraft. The materials used are: SUS304 stainless steel, titanium alloy, non-metallic PUR resin or ceramics which in case of military air crafts are incorporated to give stealth effects along with use of nickel electroforming for the protector. For coating the sulfamin acid nickel solution is used as plating solution. The sulfamin acid nickel bath in the electroforming technology is applied in aircraft industry for FRP components. In case of soft nickel electroforming a hardness of 300 Hv or less is obtained, although 450-550 Hv is required to meet the specifications. The mandrel is made from SUS304, SUS316 and the blade main body is made through a 3 dimensional machining process. In hard nickel plating the leading edge is thicker and gradually gets thinner along the cord, although depending on type of helicopter thickness ranges between 0.6-1.2 mm. The hardness of electroformed nickel is 450-550 Hv. Photographs show the products after laser cut and separation from mandrel after electrocasting.
CC 58 Metallic Coating
CT Journal Article; Airfoils: Coating; Helicopters; Erosion resistance; Titanium base alloys: Coating; Ceramics: Coating; Electroforming; Nickel: Plating; Austenitic stainless steels: Coating; Aircraft components: Coating; Hardness
ALI 304 CCA: SSA; 316 CCA: SSA

L72 ANSWER 13 OF 45 JICST-EPlus COPYRIGHT 2002 JST
AN 980832831 JICST-EPlus
TI Fabrication of functionally gradient materials in the TiC/Ti4Al2C2/TiAl system by self-propagating high-temperature synthesis/explosive shock compaction technique.
AU TANAKA HIDEKAZU; TOMOSHIGE RYUICHI; KATO AKIO
IMAMURA KIHACHIRO; CHIBA AKIRA
CS Kumamoto Inst. of Technol.
Kumamoto Univ., Fac. of Eng.
SO Kayaku Gakkaishi (Journal of the Japan Explosives Society), (1998) vol. 59, no. 4, pp. 153-159. Journal Code: F0476A (Fig. 8, Ref. 17)
ISSN: 1340-2781
CY Japan
DT Journal; Article
LA Japanese
STA New
AB Fabrication of functionally gradient materials(FGM) in the TiC/Ti4Al2C2/TiAl system has been attempted by a hot shock-compaction method which combines a self-propagating high-temperature synthesis(SHS) with underwater-shock compaction technique. **Titanium**, aluminum and graphite powders were used as raw materials. Eleven kinds of powder mixtures were prepared, and tapped into a powder charging container for explosive shock compaction experiments. The SHS reaction of the powder mixtures was initiated by using tungsten heating coil before detonating the explosive. This process was completed for about 20-30 seconds. The obtained specimens were evaluated by XRD experiments, microstructural observations, micro **vickers hardness** and thermal shock

tests. As a result, three kinds of ceramics (TiC, Ti4Al2C2 and Ti3AlC) and two kinds of intermetallic compounds (TiAl and Ti2Al) were mainly detected in the shock-compacted specimen by XRD experiments. The micro **vickers hardness** of the FGM after thermal shock tests indicated the same traced as that of the as-compacted and annealed specimens. Scanning electron microscopy revealed that the FGM bonded strongly throughout, and that there was no cracks resulted from thermal stress or passage of the shock wave in the FGM. This ternary-phase system may enable to reduce the thermal stress resultant from the thermal expansion between TiC and **titanium** aluminides. Therefore, the FGM TiC/Ti4Al2C2/TiAl system obtained in the present study is regarded as a novel material with excellent heat resistance. (author abst.)

CC YC03020V (666.5/.6)

CT combustion synthesis; **titanium**; aluminum; graphite; **titanium** carbide; **titanium** compound; aluminum compound; carbide; aluminum containing alloy; **titanium** base alloy; intermetallic compound; **impact** hardness; explosive welding; consolidation(ground); ceramics; thermal shock resistance

BT chemical synthesis; chemical reaction; synthesis; 4A group element; transition metal; metallic element; element; fourth row element; 3B group element; third row element; native element; mineral(geology); carbon compound; carbon group element compound; 4A group element compound; transition metal compound; 3B group element compound; containing alloy; light alloy; nonferrous alloy; alloy; metallic material; compound(chemical); hardness; pressure welding; welding; bonding and joining; resistance(endure)

L72 ANSWER 14 OF 45 METADEX COPYRIGHT 2002 CSA

AN 1998(4):31-1703 METADEX

TI Effect of tempering conditions on mechanical properties and microstructures of Ni modified HY180 steels.

AU Cho, G.-B. (Gyeong Sang National University); Nam, T.-H. (Gyeong Sang National University); Ahn, I.-S. (Gyeong Sang National University)

SO Journal of the Korean Institute of Metals and Materials (Oct. 1997) 35, (10), 1318-1324, Graphs, Photomicrographs, Diffraction Patterns, 10 ref. ISSN: 0253-3847

DT Journal

CY Korea, Republic of

LA Korean

AB Changes in microstructures and mechanical properties of HY180 steels with tempering condition have been investigated by means of scanning electron microscopy, transmission electron microscopy, Vickers hardness test, tensile test and Charpy impact test. Rehardening phenomena distinguished from the secondary hardening occurred in HY180 steels on tempering <813 deg K. The maximum hardness (Hv 540) and tensile strength (1370 MPa) were obtained in a 0.5 wt.% Ti-HY180 steel tempered at 753K for 20 h. This is attributed to the very fine (50 nm M 2 C(M=Mo,Cr)) carbides which appeared to be peculiar to the rehardening phenomena. The maximum impact absorption energy (208J) was obtained in a 0.05 wt.% Ti-HY180 steel tempered at 753K for 10 h. This was due to complete dissolution of brittle cementite.

CC 31 Mechanical Properties; 56 Thermal Treatment; 14 Structural Hardening

CT Journal Article; High alloy steels: Mechanical properties; Titanium: Alloying additive; Diamond pyramid hardness: Heating effects; Tensile strength: Heating effects; Impact strength: Heating effects; Carbides: Heating effects; Tempering; Precipitation hardening; Fractography; Scanning electron microscopy; Transmission electron microscopy; Electron microscopy

ALI HY180 CCA: SAH

ET Ni; H*Ti*Y; H sy 3; sy 3; Ti sy 3; Y sy 3; HY; H cp; cp; Y cp; Ti-HY; K; C; Mo; Cr; J

L72 ANSWER 15 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1997:597713 HCAPLUS
DN 127:251406
TI Boronizing of titanium and titanium alloys
AU Nakasa, Keijiro; Kato, Masahiko; Tao, Shinichi
CS Fac. Eng., Hiroshima Univ., Higashihiroshima, 739, Japan
SO Netsu Shori (1997), 37(4), 243-249
CODEN: NESHDF; ISSN: 0288-0490
PB Nippon Netsu Shori Gijutsu Kyokai
DT Journal
LA Japanese
CC 56-7 (Nonferrous Metals and Alloys)
AB Thickness of boronized layers, their morphol. and hardness in pure Ti, Ti-6Al-4V alloy, Ti-15V-3Cr-3Al-3Sn alloy and Ti-13V-11Cr-3Al alloy boronized by a molten salt bath electrolytic method were investigated. The greater the electrolysis temp. or time, the thicker the boronized case. For each alloy, there exists a c. d. to maximize the case depth. The boronized layer with the **Vickers hardness** of about 4000 kg/mm2 was formed on pure Ti sample, but in alloys the hardness was lower. In distinction to the band-like TiB2 layers in pure Ti, particulate or linear .alpha. phase was formed between TiB2 and core in Ti alloys.
ST titanium alloy boronizing electrolysis molten salt
IT Boronizing
(of titanium and titanium alloys by molten salt electrolysis)
IT 12604-38-5, Ti13V11Cr3Al 12743-70-3, Ti6Al4V **39462-06-1**, TP35H
50812-92-5, Ti15V3Cr3Al3Sn
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(boronizing of titanium and titanium alloys by molten salt electrolysis)
IT **39462-06-1**, TP35H
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(boronizing of titanium and titanium alloys by molten salt electrolysis)
RN 39462-06-1 HCAPLUS
CN Titanium alloy, base, Ti 99.4-100,Fe 0-0.30,O 0-0.25,C 0-0.10,N 0-0.03,H 0-0.015 (UNS R50400) (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99.4 - 100	7440-32-6
Fe	0 - 0.30	7439-89-6
O	0 - 0.25	17778-80-2
C	0 - 0.10	7440-44-0
N	0 - 0.03	17778-88-0
H	0 - 0.015	12385-13-6

L72 ANSWER 16 OF 45 METADEX COPYRIGHT 2002 CSA
AN 1997(12):52-2346 METADEX
TI Warm forming or heading of tough metal wires by electromagnetic induction.
AU Mazzola, G. (Termomacchine)
SO Wire Industry (1997) 64, (760), 233-236, Graphs
ISSN: 0043-6011
DT Journal
CY United Kingdom

LA English
AB Warm forming-the forming of metal heated below the recrystallization temperature-is performed for several reasons but should be used when the material does not cold form easily without intermediate annealing operations and it is desirable to reduce the force required to form the part. Five reasons for warm forming are listed, which mention prevention of cracking and springback and reduced work hardening. A list of materials requiring heat before forming include alloy steels, 300 series austenitic stainless steels, nickel alloys, titanium alloys and iron and nickel base superalloys. An outline of the metallurgical principles involved covers transformation range, stress relieving anneal; cold, warm and hot forming temperatures as percentages of the melting point and effect on tensile strength. Discussion of induction heating for warm heading of wire notes frequency ranges have been extended through new devices and lists resulting advantages. A table gives results of heating tests for various inductor lengths and wire diameters. Equipment required is normally basic cold forming machines with some modifications. Description of applications includes a production rate vs. wire diameter list.
CC 52 Working (Forming)
CT Journal Article; Nickel base alloys: Metal working; Superalloys: Metal working; Titanium base alloys: Metal working; Heat resistant steels: Metal working; High strength steels: Metal working; Nickel chromium molybdenum steels: Metal working; Austenitic stainless steels: Metal working; Forming; Warm working; Wire: Metal working; Electromagnetic induction; Induction heating; Stress relieving
ALI Monel CCA: NI; Monel CCA: SP; Inconel x CCA: NI; Inconel x CCA: SP; Rene 41 CCA: NI; Rene 41; Waspaloy CCA: NI; Waspaloy CCA: SP; Hastelloy CCA: NI; Hastelloy CCA: SP; Ti-6Al-4V CCA: TI; A286 CCA: SAHR; A286 CCA: SAHS; A286 CCA: SANCM; A286 CCA: SSA
ET Al*Ti*V; Al sy 3; sy 3; Ti sy 3; V sy 3; Ti-6Al-4V; I*T; TI; T cp; cp; I cp

L72 ANSWER 17 OF 45 METADEX COPYRIGHT 2002 CSA
AN 1999(2):52-224 METADEX
TI Microstructure development by thermomechanical processing in duplex stainless steel and beta titanium alloy.
AU Maki, T. (Kyoto University); Furuhara, T. (Kyoto University); Tsuzaki, K. (Kyoto University)
SO Minerals, Metals and Materials Society/AIME. 420 Commonwealth Dr., P.O. Box 430, Warrendale, PA 15086, USA. July 1997. 77-86, Photomicrographs, Graphs, 18 ref.
Conference: THERMEC 97: International Conference on Thermomechanical Processing of Steels and Other Materials, Wollongong, Australia, 7-11 July 1997
DT Conference Article
CY United States
LA English
AB In the case of duplex stainless steel, when the supersaturated alpha (bcc) specimen is aged after heavy cold rolling, subgrains are rapidly formed by recovery of alpha matrix and then gamma (fcc) phase precipitates at alpha subgrain boundaries. By this process, the microduplex structure which consists of alpha subgrain matrix and fine gamma precipitates is obtained. The alpha subgrains in the microduplex structure are stable and the recrystallization does not occur even after the prolonged annealing, because subgrain boundaries are pinned by fine gamma precipitates. By the cyclic treatment of slight cold rolling and short time annealing in the microduplex structure, the misorientation of alpha subgrain boundaries is continuously increased with an increase in the number of repetition and subgrains change to grains with high angle boundaries. For the Ti-15V-3Cr-3Sn-3Al alloy, alpha (hcp) phases precipitate on dislocations

before the subgrain formation of heavily deformed beta (bcc) matrix. As the aging is prolonged, the rearrangement of dislocations in beta matrix proceeds, resulting in the formation of subgrain. In this case, the distribution of fine alpha precipitates is not so uniform because of the inhomogeneity of deformation structure. In order to obtain more uniform distribution of alpha precipitates, the recovery treatment (short time annealing at higher temperatures of slightly cold rolled specimen) prior to aging is effective.

CC 52 Working (Forming)

CT Conference Paper; Duplex stainless steels: Metal working; Titanium base alloys: Metal working; Thermomechanical treatment; Precipitation hardening

ALI Ti-15V-3Cr-3Sn-3Al CCA: TI

ET Al*Cr*Sn*Ti*V; Al sy 5; sy 5; Cr sy 5; Sn sy 5; Ti sy 5; V sy 5; Ti-15V-3Cr-3Sn-3Al; I*T; TI; T cp; cp; I cp

L72 ANSWER 18 OF 45 JICST-EPlus COPYRIGHT 2002 JST

AN 940680947 JICST-EPlus

TI Self-Detection of Fracture in PZT and MoSi2-Mo2B5 Layered Composite Ceramics.

AU AKIYAMA MORITO; NONAKA KAZUHIRO; WATANABE TADAHIKO
MIYAZAKI KAZUHIDE

CS Kyushukogiken
Fukuoka Univ., Fac. of Eng.

SO Nippon Seramikkusu Kyokai Gakujutsu Ronbunshi (Journal of the Ceramic Society of Japan), (1994) vol. 102, no. 7, pp. 686-688. Journal Code: F0382A (Fig. 6, Tbl. 1, Ref. 6)
CODEN: JCSJEW; ISSN: 0914-5400

CY Japan

DT Journal; Short Communication

LA Japanese

STA New

AB A PZT(PbZr0.58Ti0.42O3) Plate was bonded to MoSi2-20wt%Mo2B5 ceramics with an adhesive. Electrical properties of the layered composite and voltage generated in the PZT by mechanical **impacts** were measured. The electromechanical coupling coefficient kp, dielectric constant .EPSILON.r and mechanical factor Qm in the composite were lower values that those in the PZT, but the piezoelectricity of the PZT was found to be left in the composite. When cracks were introduced on the MoSi2-Mo2B5 surface of the composite with the **Vickers hardness** tester, the voltage vibration above 250mV appeared. These results suggest a possibility for producing ceramic materials with a self-detecting function of crack generation and fracture. (author abst.)

CC HB04000M; HC04040H; YC03030G (620.1:666; 539.42:666; 666.5)

CT engineering ceramics; structural material; PZT; molybdenum silicide; boride; composite material; laminated material; fracture; detection; crack; flaw inspection; ferroelectrics; piezoelectricity; permittivity; impulse voltage

BT ceramics; material; zirconate; oxoate; oxygen compound; oxygen group element compound; zirconium compound; 4A group element compound; transition metal compound; titanate; **titanium** compound; lead compound; carbon group element compound; silicide; silicon compound; molybdenum compound; 6A group element compound; boron compound; 3B group element compound; inspection; dielectrics; dielectric material; electromechanical effect; electrical property; electric field effect; effect; ratio; voltage

L72 ANSWER 19 OF 45 HCAPLUS COPYRIGHT 2002 ACS

AN 1994:660931 HCAPLUS

DN 121:260931

TI Design of surface in situ metal-ceramic composite formation via laser

treatment
AU Baker, T. N.; Xin, H.; Hu, C.; Mridha, S.
CS University Strathclyde, Glasgow, UK
SO Materials Science and Technology (1994), 10(6), 536-44
CODEN: MSCTEP; ISSN: 0267-0836
PB Institute of Materials
DT Journal
LA English
CC 56-4 (Nonferrous Metals and Alloys)
Section cross-reference(s): 57
AB The creation of wear resistant surface metal matrix composites in both aluminum alloys and titanium via the incorporation of preplaced SiCp has been successfully undertaken by using a 5 kW CO2 laser. The problems assocd. with the prodn. of a metal matrix composite layer free from porosity, cavities, and cracks, with a satisfactory distribution of ceramic were considered. Optimum laser processing conditions for Al-SiCp gave a well distributed ceramic with few defects, but limited to 35 .mu.m thickness. This was increased to 250 .mu.m using a preplaced mixt. of Al powder and SiCp. A preplaced SiCp layer on com. pure Ti resulted in a dissoln. of SiCp and pptn. of TiC, or the partial dissoln. of SiCp and agglomeration into a hard layer (1400 **HV**). Pin on disk wear tests indicated that surfaces could be produced via laser surface melting assocd. with preplaced SiCp which showed a similar wear resistance to bulk metal matrix composite Al alloy-SiCp, and an improvement of an order of magnitude for com. pure Ti-SiCp surface metal matrix composites, over a com. pure Ti laser treated surface.
ST composite ceramic laser surfacing metal; silicon carbide composite laser surfacing; aluminum ceramic composite laser surfacing; titanium ceramic composite laser surfacing
IT Laser radiation
(surface composite layer formation by laser melting of SiC, Al alloy, and Ti powders)
IT 7429-90-5, Aluminum, processes 12616-75-0, AA 6061 100413-98-7, AA 8090
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(composites; surface composite layer formation by laser melting of SiC and Al alloy powders on)
IT **37246-34-7**, IMI 115
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(composites; surface composite layer formation by laser melting of SiC and Ti powders on)
IT 409-21-2, Silicon carbide, processes
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(composites; surface composite layer formation by laser melting of SiC, Al alloy, and Ti powders)
IT **37246-34-7**, IMI 115
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(composites; surface composite layer formation by laser melting of SiC and Ti powders on)
RN 37246-34-7 HCAPLUS
CN Titanium alloy, base, Ti 99.5-100,Fe 0-0.20,O 0-0.18,C 0-0.10,N 0-0.03,H 0-0.015 (UNS R50250) (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number

Ti	99.5 - 100	7440-32-6
Fe	0 - 0.20	7439-89-6
O	0 - 0.18	17778-80-2
C	0 - 0.10	7440-44-0
N	0 - 0.03	17778-88-0
H	0 - 0.015	12385-13-6

L72 ANSWER 20 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1995:214960 HCAPLUS
DN 122:14782
TI Structure of Ti-N and Ti-B based sintered alloys
AU Sato, Kenji; Otake, Masatoshi; Hosoya, Tatuo
CS Shizuoka Kogyo Gijutsu Center, Japan
SO Shizuoka-ken Hamamatsu Kogyo Gijutsu Senta Kenkyu Hokoku (1994), 4, 41-6
CODEN: SHKGEF; ISSN: 0916-8389
DT Journal
LA Japanese
CC 56-8 (Nonferrous Metals and Alloys)
AB Two-step pressurized sintering in vacuum-Ar gas was examd. for titanium powder with added nitride powder (TiN or Cr2N) or boride powder (TiB2). The microstructure and mech. property of the sintered alloys were investigated. Nitrogen in added TiN and Cr2N powders are soluted into .alpha.-Ti or .beta.-Ti. For the Ti-N sintered alloys, few pores are obsd., the densities are very high, the **Vickers hardness** are high, and the texture is very brittle. Added TiB2 powder is reduced into TiB during sintering, and the TiB is dispersed into matrix. In the Ti-B sintered alloys, pores are present and the **Vickers hardness** is comparative to that of the Ti-C and Ti-N alloys.
ST sintering titanium compd structure; nitrogen titanium sintering structure; boron titanium sintering structure
IT Sintering
(of titanium compds. and their structures)
IT 159596-65-3 159596-66-4 159596-67-5 159596-68-6 **159596-69-7** 159596-70-0 159596-71-1 159596-72-2 159596-73-3 159596-74-4 159596-75-5
RL: PRP (Properties)
(structure of sintered)
IT **159596-69-7**
RL: PRP (Properties)
(structure of sintered)
RN 159596-69-7 HCAPLUS
CN Titanium alloy, base, Ti 99,BN 1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
BN	1	10043-11-5

L72 ANSWER 21 OF 45 JICST-EPlus COPYRIGHT 2002 JST
AN 930321363 JICST-EPlus
TI Preparation of Fe-TiN Nanocomposite-powders and their Shock Consolidation.
AU YAMASAKI TOORU; OGINO YOSHIKIYO
FUKUOKA KIYOTO; ATO TOSHIYUKI; SHONO YASUHIKO
WANG W
CS Himeji Inst. of Technology, Faculty of Engineering
Himeji Inst. of Technology, Graduate School
Tohoku Univ., Inst. for Materials Res.

SO Funtai oyobi Funmatsu Yakin (Journal of the Japan Society of Powder and Powder Metallurgy), (1993) vol. 40, no. 3, pp. 324-327. Journal Code: F0691A (Fig. 6, Tbl. 1, Ref. 9)
CODEN: FOFUA2; ISSN: 0532-8799
CY Japan
DT Journal; Article
LA Japanese
STA New
AB Fe100-XTiX(X=25,50,75at.%) powder mixtures were milled in vibrational ball mill under N2 atmosphere, and the milled powders were dynamically compacted by using a propellant gun. It was found that Fe-**Ti** milled powders were consisted of .ALPHA.-iron and TiN phases. These powders had nanostructures with grain sizes of about 4-7nm in diameter. By dynamically compacting the Fe50(TiN)50 powder at the shock pressures of 38.6GPa and above, a nanocomposite material having an extremely high hardness(**Hv**-1300) was obtained. When the material was annealed at 1073K for 5h, the grain growth occurred to about 20nm for .ALPHA.-iron phase, and the hardness was increased to a maximum value(**Hv** -1600). With increasing annealing temperature above 1173K, the grain growth occurred and the hardness drastically decreased. (author abst.)
CC WC02040I; WE04030R (621.767; 669-492)
CT iron base alloy; **titanium** compound; duplex structure; mechanical alloying; shock(mechanics); dynamic powder compacting; dispersion hardening alloy; pressure forming; thermal stability; grain size(crystal); densification; nitriding; grain refinement; microhardness; heat treatment condition; **impact** effect; microcrystal; nanocomposites
BT iron and steel; metallic material; 4A group element compound; transition metal compound; metal structure(microstructure); organization; alloying; modification; phenomena in strength of material; phenomenon; powder compacting; alloy; composite material; material; forming and molding; stability; particle size(ratio); degree; surface heat treatment; heat treatment; treatment; hardness; condition; effect; crystal; solid(matter)

L72 ANSWER 22 OF 45 METADEX COPYRIGHT 2002 CSA
AN 1994(9):14-228 METADEX
TI Study on Age Hardening High Speed Steel. I. Properties of Age Hardening High Speed Steel.
AU Li, Z.H. (Shejiazhuang Army University)
SO Materials for Mechanical Engineering (China) (June 1993) 17, (3), 36-38, 45, Graphs.$R2 ref
ISSN: 1000-3738
DT Journal
LA Chinese
AB The alloying priniciple, melting, forging, and heat treatment processes of non-carbon Fe-W(Mo)-Co(Ni) series age hardening high speed steels are introduced. Main properties are given and compared with those of conventional high speed steels. Results show that alloy with high cobalt content has strong age hardening ability. After aging, it gives the same hardness, HRC 68-69, as superhard high speed steel (M42). HRTC 60-61 are retained after heating at 700 for 4 h, which are higher by 17 HRC, and 12-14 HRC than 18-4-1 and M42, respectively under the same condition. The high-temperature HV hardness values at 500 and 600 C are higher by 100 HV than those of M42. The impact value of the un-notched specimen is 16 J/cm 2, and the bending stress is 2300 N/mm 2, while hardness is HRC 69. The ductility increases with addition of nickel and lowering of Co. The impact value of un-notched specimen is approx30 J/cm 2, the bending stress is approx350 N/mm 2, while hardness is approxHRC 66-67. Hardness, red-hardness, especially high-temperature hardness, however, decreased. The experimental results of the tool performance are also introduced. Cutting TC9 titanium base alloy and Ni-base superalloys is discussed.

CC 14 Structural Hardening; 53 Machining
CT Journal Article; High speed tool steels: Structural hardening; Cutting tools: Service life; Aging (artificial); Quenching and tempering; Hardness; Impact strength; Ductility; Nickel base alloys: Cutting; Superalloys: Cutting; Titanium base alloys: Cutting; Cutting
ALI TC9 CCA: TI
ET I; Co*Fe*Mo*Ni*W; Co sy 5; sy 5; Fe sy 5; Mo sy 5; Ni sy 5; W sy 5; W(Mo); W cp; cp; Mo cp; Co(Ni); Co cp; Ni cp; Fe-W(Mo)-Co(Ni); C; Co; Ni; I*T; TI; T cp; I cp

L72 ANSWER 23 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1992:576331 HCAPLUS
DN 117:176331
TI Titanium alloy for manufacture of base plates of magnetic disks
IN Fukai, Hideaki; Sakiyama, Toshio; Suenaga, Hiroyoshi; Minagawa, Kuninori
PA Nippon Kokan K. K., Japan
SO Jpn. Kokai Tokkyo Koho, 12 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C22C014-00
ICS C22F001-18; G11B005-82; G11B005-84
CC 56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 04072028	A2	19920306	JP 1990-180538	19900710

AB High-quality base plates of magnetic disks are manufd. from the Ti alloy contg. O .ltoreq.0.6, and Al .ltoreq.4.0%, but [(5/2)O + (1/3)Al] .gtoreq.1.0, and (Mo + Ni + Co + Cr + Fe) 0.2-2.0%. The Ti alloy is cold-rolled at .gtoreq.30% draft into a strip, which is hot adjusted at a temp. (T) of 500 .ltoreq. T .ltoreq. -(300/11)t + 10,200/11, where t = hot adjusting time .gtoreq.1 h. The Ti alloy strip shows wear resistance, **Vickers hardness** 254-310, and has grain refinement under centrifugal acceleration 4.2-8.1 m/s2.
ST titanium alloy plate magnetic disk
IT 143903-62-2P 143903-63-3P 143903-64-4P 143903-65-5P
143904-20-5P 143904-21-6P 143904-22-7P 143904-23-8P
143904-24-9P **143904-25-0P** 143904-26-1P 143904-27-2P
143904-28-3P 143904-29-4P 143904-30-7P 143904-31-8P 143904-32-9P
143904-33-0P 143904-34-1P 143904-35-2P 143904-36-3P 143904-37-4P
143904-38-5P 143904-39-6P 143904-40-9P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(magnetic disk base plate, high-quality, manuf. of)
IT **143904-20-5P 143904-25-0P**
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(magnetic disk base plate, high-quality, manuf. of)
RN 143904-20-5 HCAPLUS
CN Titanium alloy, base, Ti 99,O 0.4,Fe 0.1,Mo 0.1,Ni 0.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
O	0.4	17778-80-2
Fe	0.1	7439-89-6
Mo	0.1	7439-98-7

Ni	0.1	7440-02-0

RN 143904-25-0 HCAPLUS
CN Titanium alloy, base, Ti 99,Al 0.5,O 0.5,Ni 0.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
Al	0.5	7429-90-5
O	0.5	17778-80-2
Ni	0.1	7440-02-0

L72 ANSWER 24 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1994:224273 HCAPLUS
DN 120:224273
TI Structure and strength of Ti-Fe sintered alloy
AU Sato, Kenji; Imafuku, Yoshihiko; Hosoya, Tatuo
CS Shizuokaken Hamamatsu Kogyogijutsu Cent., Hamamatsu, Japan
SO Shizuoka-ken Hamamatsu Kogyo Gijutsu Senta Kenkyu Hokoku (1992), 2, 43-7
CODEN: SHKGEF; ISSN: 0916-8389
DT Journal
LA Japanese
CC 56-12 (Nonferrous Metals and Alloys)
AB Microstructures and mech. properties of Ti-(0-8%) Fe sintered alloy from blended elemental method were investigated. Fe in the blend diffused into Ti to form .alpha. + .beta. microstructures. The d. of the sinter increased as sintering temp. increased; the relative d. reached 95% under sintering at 1100.degree.. The **Vickers hardness** of the sinter increased with increasing of sintering temp. and Fe content. The tensile strength of the sinter was the max. at 4% Fe ~~and 1100.degree.~~ sintering.
ST titanium iron sintering structure strength
IT Sintering
(of titanium-iron powder compact, structure and strength after)
IT Diffusion
(or iron into titanium, dual-phase structure from)
IT 7439-89-6, Iron, miscellaneous
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(diffusion of, in titanium-iron powder pact under sintering, dual-phase from)
IT **154250-21-2**
RL: PROC (Process)
(sintering of, structure and strength after)
IT **154250-21-2**
RL: PROC (Process)
(sintering of, structure and strength after)
RN 154250-21-2 HCAPLUS
CN Titanium alloy, base, Ti 92-100,Fe 0-8 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	92 - 100	7440-32-6
Fe	0 - 8	7439-89-6

L72 ANSWER 25 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1991:544928 HCAPLUS

DN 115:144928
TI Method of producing anode materials for electrolytic uses
IN Taki, Kazuhiro
PA Nippon Mining Co., Ltd., Japan
SO U.S., 5 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM C22F001-18
ICS C22C014-00; C25B011-04
NCL 148011500R
CC 72-2 (Electrochemistry)
Section cross-reference(s): 56
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 4997492	A	19910305	US 1990-535272	19900608
	DE 4018694	A1	19911212	DE 1990-4018694	19900611
	GB 2245002	A1	19911218	GB 1990-13327	19900614
PRAI	US 1990-535272		19900608		

AB The method comprises heat-treating a Ti alloy which consists of 0.1-10 wt.% Ni and unavoidable impurities and which has been thermally affected above its beta transformation point, at 400-800.degree. during the process. Alternatively, the alloy is cold-rolled to a working degree of .gtoreq.10 percent prior to the heat treatment. The anode material is made to have a surface roughness, Rmax, of .gtoreq.100 .mu.m, a yield strength of .gtoreq.30 kgf/mm2, a **Vickers hardness** of .gtoreq.150, and a flatness of .ltoreq.6 mm/m.
ST anode electrochem titanium alloy heat treatment
IT Anodes
(titanium alloy, heat treatment of, for electrochem. use)
IT 39315-08-7 39315-09-8 59124-57-1 **131835-67-1**
RL: PROC (Process)
(heat treatment of, as anodes for electrochem. use)
IT **131835-67-1**
RL: PROC (Process)
(heat treatment of, as anodes for electrochem. use)
RN 131835-67-1 HCAPLUS
CN Titanium alloy, base, Ti 99,Ni 1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
Ni	1	7440-02-0

L72 ANSWER 26 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1992:412711 HCAPLUS
DN 117:12711
TI Aluminum and oxygen in titanium alloy base plates for magnetic disks
IN Inagaki, Hirosuke
PA Nippon Kokan K. K., Japan
SO Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C22C014-00
ICS G11B005-82
CC 56-3 (Nonferrous Metals and Alloys)

Section cross-reference(s): 77

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 03247734	A2	19911105	JP 1990-42890	19900223
	JP 08009746	B4	19960131		
	CA 2036719	AA	19910824	CA 1991-2036719	19910220
PRAI	JP 1990-42890		19900223		

AB The magnetic disks for high-d. recording are made of base plates from the Ti alloy that contains O and Al specified by an area encompassed by the points (0, 0.4), (0, 0.6), (4, 0.6), (4, 0), and (3, 0) in an O vs. Al diagram. The Ti alloy developed no cracks or deformed twin crystals in cold rolling or polishing and had **Vickers hardness** 256-301 and surface roughness 0.02 .mu.m.

ST aluminum oxygen titanium alloy; titanium alloy magnetic disk

IT 11143-98-9 113792-12-4 141825-42-5 141825-43-6 141825-44-7 141825-45-8 141825-46-9 **141825-47-0** 141825-48-1 141825-49-2 **141825-50-5** 141825-51-6 141825-52-7 141825-53-8 141825-54-9 141825-55-0
RL: USES (Uses)
(for magnetic disk base plates)

IT **141825-47-0 141825-50-5**
RL: USES (Uses)
(for magnetic disk base plates)

RN 141825-47-0 HCAPLUS

CN Titanium alloy, base, Ti 99,Al 1,O 0.4 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
Al	1	7429-90-5
O	0.4	17778-80-2

RN 141825-50-5 HCAPLUS

CN Titanium alloy, base, Ti 99,Al 0.8,O 0.5 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
Al	0.8	7429-90-5
O	0.5	17778-80-2

L72 ANSWER 27 OF 45 METADEX COPYRIGHT 2002 CSA

AN 1991(5):12-880 METADEX

TI Effect of Superplastic Deformation on Microstructure, Texture, and Tensile Properties of Ti-6Al-4V.

AU Dunford, D.V.; Wisbey, A.; Partridge, P.G.

SO Materials Science and Technology (Jan. 1991) 7, (1), 62-70
ISSN: 0267-0836

DT Journal

LA English

AB The fine grained, equiaxed duplex alpha / beta phase microstructure of Ti-6Al-4V alloy enables large uniform plastic strains to be obtained under superplastic conditions. In this paper the role of microstructure and texture in superplastic deformation is considered. A banded, two phase microstructure gives rise to anisotropic superplastic flow stresses and strains, and can affect post-formed mechanical properties. The effect of

microstructure is discussed with reference to the behaviour of Ti-6Al-4V alloy in various product forms: thick and thin sheet, extruded section and tube, and rolled bar. Manufacture costs may dictate the use of fusion welding or diffusion bonding before superplastic forming, and the effect of such joints on deformation is described. The above data are related to other published work on Ti alloys, and the implications for the manufacture of components by superplastic forming are considered. Photomicrographs. 22 ref.-AA

CC 12 CRYSTAL PROPERTIES

CT Titanium base alloys: Microstructure; Aluminum: Alloying elements; Vanadium: Alloying elements; Microstructure: Deformation effects; Texture: Deformation effects; Tensile properties: Deformation effects; Plastic deformation

ALI Ti-6Al-4V CCA: TI

ET Al*Ti*V; Al sy 3; sy 3; Ti sy 3; V sy 3; Ti-6Al-4V; Ti; I*T; TI; T cp; cp; I cp

L72 ANSWER 28 OF 45 HCAPLUS COPYRIGHT 2002 ACS

AN 1991:10777 HCAPLUS

DN 114:10777

TI Nitriding of **titanium** or its alloy for marine service

IN Yamaguchi, Yuichiro

PA Sumitomo Metal Industries, Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C23C008-24

CC 56-7 (**Nonferrous** Metals and Alloys)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 02025559	A2	19900129	JP 1988-174600	19880713
	JP 06063081	B4	19940817		

AB The **Ti** or **Ti**-alloy parts for corrosion-resistant marine structures are nitrided for .gtoreq.1 h at 400-850.degree. in the atm. contg. 20-100 vol.% NH3. The nitrided parts show **Vickers hardness** 820-870 and Charpy **impact** toughness 2.5-3.1 kg-m.

ST **titanium** alloy nitriding marine service

IT Nitridation
(gas, of **titanium** or its alloys, corrosion resistance for marine service by)

IT 7727-37-9
RL: USES (Uses)
(nitridation, gas, of **titanium** or its alloys, corrosion resistance for marine service by)

IT **7440-32-6, Titanium,** reactions 12743-70-3
RL: RCT (Reactant)
(nitriding of, for corrosion-resistant marine structures)

IT **7440-32-6, Titanium,** reactions
RL: RCT (Reactant)
(nitriding of, for corrosion-resistant marine structures)

RN 7440-32-6 HCAPLUS

CN Titanium (8CI, 9CI) (CA INDEX NAME)

Ti

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L72  ANSWER 29 OF 45  HCAPLUS  COPYRIGHT 2002 ACS
AN   1990:483389  HCAPLUS
DN   113:83389
TI   Polygonal titanium alloy powder for hardfacing titanium or its alloy parts
IN   Takahashi, Wataru; Nakanishi, Mutsuo
PA   Sumitomo Metal Industries, Ltd., Japan
SO   Jpn. Kokai Tokkyo Koho, 5 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C22F001-18
CC   56-6 (Nonferrous Metals and Alloys)
FAN.CNT 1
     PATENT NO.        KIND  DATE           APPLICATION NO.  DATE
     ---------------   ----  --------       ---------------  --------
PI   JP 01212741        A2   19890825       JP 1988-34757    19880217
     JP 06092602        B4   19941116
AB   The polygonal Ti alloy powder (60-250 mesh) contg. 0.15-3% O and
     optionally 1-80% carbide and/or nitride is used to hardfacing Ti or Ti
     alloy parts to show Vickers hardness 440 and wear 40
     mg, vs. 180 and 600 mg for the Ti part without the hardfacing.
ST   titanium alloy powder hardfacing
IT   Welding
        (hard-facing, of titanium or its alloy, with powd. titanium alloy)
IT   7440-32-6, Titanium, uses and miscellaneous 11144-00-6
     11144-01-7   12743-70-3   128548-31-2   128570-12-7   128570-13-8
     128570-14-9   128570-15-0
     RL: USES (Uses)
        (hard facing with, of titanium or its alloy, for wear resistance)
IT   11144-00-6
     RL: USES (Uses)
        (hard facing with, of titanium or its alloy, for wear resistance)
RN   11144-00-6  HCAPLUS
CN   Titanium alloy, base, Ti 99,O 1 (9CI)  (CA INDEX NAME)

Component   Component      Component
             Percent    Registry Number
=========+============+===============
    Ti         99          7440-32-6
    O           1          17778-80-2


L72  ANSWER 30 OF 45  HCAPLUS  COPYRIGHT 2002 ACS
AN   1990:203327  HCAPLUS
DN   112:203327
TI   Surface hardening of titanium products
IN   Takahashi, Wataru; Okada, Minoru; Nakanishi, Mutsuo
PA   Sumitomo Electric Industries, Ltd., Japan
SO   Jpn. Kokai Tokkyo Koho, 5 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C22F001-18
CC   56-5 (Nonferrous Metals and Alloys)
FAN.CNT 1
     PATENT NO.        KIND  DATE           APPLICATION NO.  DATE
     ---------------   ----  --------       ---------------  --------
PI   JP 01156457        A2   19890620       JP 1987-314791   19871211
     JP 07076431        B4   19950816
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AB The surfaces of Ti or Ti alloy products (esp. for mech. parts) are melted by a high-energy source, and a powd. Ti contg. O and optionally hard powders (W2C, TiC, etc.) are sprayed on the melted surfaces to increase wear resistance. The **Vickers hardness** and wear amt. in a sliding test at distance of 2.5 .times. 104 m for a Ti treated by plasma surface melting and addn. of 50:50 vol. mixt. of powd. Ti-1% O and W2C were 440 and 40 mg vs. 180 and 600 mg for a nontreated Ti.
ST surface hardening titanium alloy wear; tungsten carbide surface hardening titanium; oxygen surface hardening titanium
IT **11144-00-6** 12070-08-5, Titanium carbide (TiC) 12070-13-2, Tungsten carbide (W2C) 25583-20-4, Titanium nitride (TiN) 113792-12-4 127030-75-5 127030-76-6
RL: USES (Uses)
(in surface hardening of titanium products by plasma melting)
IT 7440-32-6, Titanium, uses and miscellaneous 12743-70-3
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(surface hardening of, plasma surface melting with oxygen-contg. titanium powder addn. in)
IT **11144-00-6**
RL: USES (Uses)
(in surface hardening of titanium products by plasma melting)
RN 11144-00-6 HCAPLUS
CN Titanium alloy, base, Ti 99,O 1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
O	1	17778-80-2

L72 ANSWER 31 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1989:538924 HCAPLUS
DN 111:138924
TI Manufacture of pressure-, wear-, and corrosion-resistant layers
IN Repenning, Detlev
PA Fed. Rep. Ger.
SO Ger. Offen., 3 pp.
CODEN: GWXXBX
DT Patent
LA German
IC ICM C23F017-00
ICS C23C008-48; C23C008-24; C23C014-22; C23C028-00; C21D009-00
ICA C23C014-32; C23C014-28
CC 56-6 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 3742317	A1	19890622	DE 1987-3742317	19871214
	EP 320706	A1	19890621	EP 1988-120081	19881201
	EP 320706	B1	19920701		
	R: AT, BE, CH, DE, ES, FR, GB, GR, IT, LI, LU, NL, SE				
	AT 77847	E	19920715	AT 1988-120081	19881201
PRAI	DE 1987-3742317		19871214		
	EP 1988-120081		19881201		

AB A metallic substrate is diffusion hardened (nitrided) at 5 .times. 10-6-5 .times. 10-5 bar; coated with an intermediate layer of Cr, Ti-0.15% Pd alloy, or Ta; and phys. vapor deposition coated at 5 .times. 10-7 bar with a 10-4-6 .times. 10-3-mm-thick carbide-, nitride-, or carbonitride-base top layer of high hardness. The resp. thickness and **Vickers**

hardness of the diffusion layer are 0.03-0.12 mm and 700-1200. Nitriding is carried out in the gas phase or in a salt bath by using pulse plasma technique. The intermediate as well as the top layers are deposited by sputtering or arc-ion plating.

ST nitriding chromium coating wear; tantalum coating nitriding corrosion; titanium palladium alloy coating nitriding; carbide coating nitriding wear; nitride coating carbide wear; carbonitride coating nitriding wear

IT Nitrides
RL: PEP (Physical, engineering or chemical process); PROC (Process) (coating with carbides and, in manuf. of multilayer corrosion- and wear, and pressure-resistant coating)

IT Carbides
RL: PEP (Physical, engineering or chemical process); PROC (Process) (coating with nitrides and, in manuf. of multilayer corrosion- and wear- and pressure-resistant coating)

IT Nitridation
(in manuf. of multilayer corrosion- and wear- and pressure-resistant coating)

IT 7440-25-7, Tantalum, uses and miscellaneous 7440-47-3, Chromium, uses and miscellaneous **12793-98-5**
RL: PEP (Physical, engineering or chemical process); PROC (Process) (coating with, in manuf. of multilayer corrosion- and wear- and pressure-resistant coating)

IT 7727-37-9
RL: PEP (Physical, engineering or chemical process); PROC (Process) (nitridation, in manuf. of multilayer corrosion- and wear- and pressure-resistant coating)

IT **12793-98-5**
RL: PEP (Physical, engineering or chemical process); PROC (Process) (coating with, in manuf. of multilayer corrosion- and wear- and pressure-resistant coating)

RN 12793-98-5 HCAPLUS

CN Titanium alloy, base, Ti 99-100,Fe 0-0.30,Pd 0.12-0.25,O 0-0.25,C 0-0.10,N 0-0.03,H 0-0.015 (UNS R52400) (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99 - 100	7440-32-6
Fe	0 - 0.30	7439-89-6
Pd	0.12 - 0.25	7440-05-3
O	0 - 0.25	17778-80-2
C	0 - 0.10	7440-44-0
N	0 - 0.03	17778-88-0
H	0 - 0.015	12385-13-6

L72 ANSWER 32 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1989:43252 HCAPLUS
DN 110:43252
TI Forged titanium alloy parts
IN Takahashi, Wataru; Okada, Minoru; Kuwayama, Tetsuya; Masuda, Mitsuru
PA Sumitomo Metal Industries, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C22C014-00
ICS B21J001-02; C23C008-10
CC 56-3 (Nonferrous Metals and Alloys)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 63186841	A2	19880802	JP 1987-17866	19870128
	JP 2792021	B2	19980827		

AB The forged parts (esp. automotive or aircraft valve or gear) are manufd. from Ti alloy contg. 5-22% Zr, or .gtoreq.1% Zr with the content adjusted for O content. The Ti alloy is drawn into a rod, oxidized for 10-60 min at 450-600.degree., lubricated, and then cold-forged into a product of **Vickers hardness** of .gtoreq.270. The product is optionally nitrided at 400-550.degree.. Thus, an ingot of the Ti alloy contg. 1.0% Zr and 0.16% O was heated to 1100.degree., hot-forged into a wire at 850.degree., lubricated with a fluorocarbon resin, and cold-drawn into a rod with 7% redn. The rod was shot-blasted, oxidized 20 min in air at 500.degree., lubricated with MoS2, and then cold-forged into a valve without a surface burn defect. The valve showed **Vickers hardness** of 300.

ST titanium zirconium alloy valve gear; automotive titanium alloy forging; aircraft titanium alloy forging

IT Gears
Valves
(titanium-zirconium alloy, cold forging of, for high hardness)

IT 62588-53-8 110564-55-1 **118470-17-0** 118470-18-1 118470-19-2 **118470-20-5** 118470-21-6
RL: PROC (Process)
(forging of, for valve or gear with high hardness)

IT **118470-17-0** **118470-20-5**
RL: PROC (Process)
(forging of, for valve or gear with high hardness)

RN 118470-17-0 HCAPLUS

CN Titanium alloy, base, Ti 99,Zr 1,O 0.2 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
Zr	1	7440-67-7
O	0.2	17778-80-2

RN 118470-20-5 HCAPLUS

CN Titanium alloy, base, Ti 99,Zr 1,O 0.3 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
Zr	1	7440-67-7
O	0.3	17778-80-2

L72 ANSWER 33 OF 45 METADEX COPYRIGHT 2002 CSA

AN 1989(12):31-5203 METADEX

TI An Investigation on the Wear Resistance of High Manganese Steel Impact Plate.

AU Chang, J.

SO Foundry Technol. (China) (May 1988) (3), 13-17

DT Journal

LA Chinese

AB The impact plates are consumable parts in the pulverizer of a power plant. They are easily worn and eroded by the soft abrading action of coal; the

surface hardness is only approx 350 HB. By adding vanadium, Ti, Mo and rare earth elements and the effect of precipitation strengthening, the structure of ZGMn13 is composed of austenite and dispersive carbides. The microhardness of the layer near the surface reaches 618 HV. Its servicing live increased 1-2 times. The cost increment is only approx 30%. Moreover, if 1-2% Cr addition is used for substituting the Mo in the composition, the amount of dispersive carbide increases and the erosion wear resistance is further improved.-AA

CC 31 MECHANICAL PROPERTIES

CT Manganese steels: Mechanical properties; Crushers; Hardness: Alloying effects; Wear resistance: Alloying effects; Microstructure; Carbides; Grain size; Molybdenum: Alloying elements; Titanium: Alloying elements; Vanadium: Alloying elements

ALI ZGMn13 CCA: SAM; ZHMn13VTiMo CCA: SAM

ET Ti; Mo; Cr

L72 ANSWER 34 OF 45 HCAPLUS COPYRIGHT 2002 ACS

AN 1987:559735 HCAPLUS

DN 107:159735

TI Titanium alloy for eyeglass frames

IN Okada, Minoru; Nishikawa, Tomio; Ichihashi, Hiroyuki; Sugimoto, Yoshihito; Ko, Masaki

PA Sumitomo Metal Industries, Ltd., Japan; Sanyo Tokushu Gokin K. K.

SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM G02C005-00
ICS C22C014-00

CC 56-3 (Nonferrous Metals and Alloys)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 62087932	A2	19870422	JP 1985-228458	19851014
	JP 06046269	B4	19940615		

AB Cold-workable Ti alloy with a suitable work-hardening property for the title frames contains .gtoreq.1.0% Zr and, optionally, .ltoreq.1% Al, Sn, Fe, Cu, and/or Cr. The alloy satisfies compn. relations: ~~Zr + 25O~~ .gtoreq.5 and 3Zr + 220O .ltoreq.66. An ingot of Ti-7 Zr-0.2% O alloy was soaked at 1100.degree., forged, heated at 850.degree., and forged into a rod (diam. 9 mm) which was then cold-swaged with intermediate annealing for draft 71%. The product showed **Vickers hardness** 320. When the compn. relations were not satisfied, the cold-swaged product showed cracks.

ST titanium zirconium alloy eyeglass frame; oxygen zirconium alloy eyeglass frame

IT Eyeglasses
(frames, titanium-zirconium alloys for, compn. relations and cold workability of)

IT 62588-53-8 **110564-54-0**, Oxygen 0-0.3, titanium 96-99, zirconium 1-4 110564-55-1, Titanium 82, zirconium 18 110564-56-2, Oxygen 0.1-0.2, titanium 90, zirconium 10 110564-57-3, Aluminum 1, oxygen 0.1, titanium 89, zirconium 10 110564-58-4, Iron 1, oxygen 0.1, titanium 89, zirconium 10 110564-59-5, Copper 1, oxygen 0.1, titanium 89, zirconium 10 110564-60-8, Chromium 1, oxygen 0.1, titanium 89, zirconium 10 110564-61-9, Aluminum 0.5, oxygen 0.1, tin 0.5, titanium 89, zirconium 10 110564-62-0, Chromium 0.3, copper 0.3, iron 0.4, oxygen 0.1, titanium 89, zirconium 10 110564-63-1, Aluminum 0.3, chromium 0.2, copper 0.1, iron 0.2, oxygen 0.1, tin 0.2, titanium 89, zirconium 10 110564-64-2, Oxygen 0.2, titanium 93, zirconium 7 110564-65-3, Oxygen 0.1, titanium 86,

zirconium 14 110612-84-5, Oxygen 0.1, tin 1, titanium 89, zirconium 10
RL: PROC (Process)
(for eyeglass frames, cold workability and compn. relations of)
IT **110564-54-0**, Oxygen 0-0.3, titanium 96-99, zirconium 1-4
RL: PROC (Process)
(for eyeglass frames, cold workability and compn. relations of)
RN 110564-54-0 HCAPLUS
CN Titanium alloy, base, Ti 96-99,Zr 1-4,O 0-0.3 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	96 - 99	7440-32-6
Zr	1 - 4	7440-67-7
O	0 - 0.3	17778-80-2

L72 ANSWER 35 OF 45 WPIX (C) 2002 THOMSON DERWENT
AN 1987-173008 [25] WPIX
DNC C1987-072014
TI High strength titanium alloy with excellent cold workability - contains aluminium, oxygen and niobium.
DC M26
PA (SUMQ) SUMITOMO METAL IND LTD
CYC 1
PI JP 62103331 A 19870513 (198725)* 5p
ADT JP 62103331 A JP 1985-240998 19851028
PRAI JP 1985-240998 19851028
IC **C22C014-00**
AB JP 62103331 A UPAB: 19930922
Ti alloy includes Al 0.8-1.5%, O 0.2-0.3% and Nb 2.0-5.0%.
USE - Commercially available pure **Ti metal** is included with Al and O to provide hardness after cold-working to more than **Hv** 270 without intermediate annealing and cold workability more than 70% by beta-phase stabilising element Nb.
0/0
FS CPI
FA AB
MC CPI: M26-B06; M26-B06A; M26-B06N

L72 ANSWER 36 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1985:171036 HCAPLUS
DN 102:171036
TI Titanium alloy for decorative use
IN Kurahashi, Kazuo
PA Nippon Gakki Seizo K. K., Japan
SO Ger. Offen., 12 pp.
CODEN: GWXXBX
DT Patent
LA German
IC ICM C22C014-00
ICS B44C001-00; B44C001-14; A44C027-00; G02C005-00
CC 56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 3424030	A1	19850207	DE 1984-3424030	19840629
	JP 60013041	A2	19850123	JP 1983-120045	19830701
	JP 02057136	B4	19901204		
PRAI	JP 1983-120045		19830701		

AB Ti alloys contg. Ni 0.05-4, Cu 0.05-4, and optionally Al 0.01-1, impurities (O, N, H, Fe, and Co) .ltoreq.1% have better elasticity, spot weldability, brazeability and formability than Ti and Ti-3Al-2.5V ref. alloy, resp., and used for watch parts and frames of eyeglasses. Thus a Ti alloy [96033-73-7] contg. Ni2, Cu 3, Al 0.8, and impurities 0.2% had **Vickers hardness** 300, tensile strength 72 g/mm2, elongation 12%, springback and bending moment (at an angle of 30 or 61.degree.) 96 or 90% and 2 or 3.3 kg-cm, resp., and satisfactory spot weldability vs. 200, 50, 29; 93, 78; 1.8, 2.5; and satisfactory for Ti and 320, 96, 16; 94, 90; 2, 3.3; and faulty spot weldability for the Ti-3Al-2.5V alloy.

ST titanium nickel copper aluminum; watch titanium nickel copper; eyeglasses frame titanium nickel copper

IT Watches
    (titanium alloys for)

IT Soldering
    (brazing, of titanium alloys, for frames of eyeglasses and watches)

IT Eyeglasses
    (frames, titanium alloys for)

IT Weldability
    (spot, of titanium alloys, for frames of eyeglasses and watches)

IT 96033-73-7
    RL: USES (Uses)
    (for frames of eyeglasses and watches)

IT **96033-74-8 96033-75-9**
    RL: USES (Uses)
    (for watches and eyeglasses frames)

IT **96033-74-8 96033-75-9**
    RL: USES (Uses)
    (for watches and eyeglasses frames)

RN 96033-74-8 HCAPLUS

CN Titanium alloy, base, Ti 96-99,Ni 0.5-2,Cu 0.1-1,Al 0-0.8 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	96 - 99	7440-32-6
Ni	0.5 - 2	7440-02-0
Cu	0.1 - 1	7440-50-8
Al	0 - 0.8	7429-90-5

RN 96033-75-9 HCAPLUS

CN Titanium alloy, base, Ti 94-100,Ni 0.5-3,Cu 0-3 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	94 - 100	7440-32-6
Ni	0.5 - 3	7440-02-0
Cu	0 - 3	7440-50-8

L72 ANSWER 37 OF 45 METADEX COPYRIGHT 2002 CSA

AN 1984(10):52-1708 METADEX

TI The Effect of Mechanical Properties on the Wrinkling Behavior of Sheet Materials in the Yoshida Test.

AU Szacinski, A.M.; Thomson, P.F.

SO J. Mech. Work. Technol. (June 1984) 10, (1), 87-102
ISSN: 0378-3804

DT Journal
LA English
AB The effect of material properties on the initiation of wrinkling and on wrinkle height at 2% mean axial extension of a range of sheet metals (mild steel, austenitic stainless steels 409D and 404, Ti, Cu, 70/30 brass and Al alloys 1100, 3004, 5005) was investigated using the Yoshida or handkerchief' test. The onset of wrinkling was accelerated by strain rate, normal plastic anisotropy and by yield strength but was delayed by increase in Luders strain (yield elongation) when present, by work hardening and by positive strain-rate sensitivity. The growth of wrinkles was retarded by Luders strain, work hardening, by high values of the ratio r */YS and of the coefficient of strain-rate sensitivity, but was promoted by increasing yield strength. Initiation of wrinkling occurred later when the upper yield point had not been removed but growth was more rapid. Growth was slower when Ludering had been removed: hence, in industrial practice, the usual procedure of temper rolling before sheet forming might be disadvantageous in those applications in which Luders bands (stretched strains) on the product could be tolerated. The close correlations obtainable for the same or similar materials in different conditions confirm the usefulness of the Yoshida test for comparing these materials with respect to the onset and growth of wrinkles, whereas the test appears less useful for rating the wrinkling behavior of different types because of unaccounted factors. 11 ref.-AA
CC 52 WORKING (FORMING)
CT Carbon steels: Metal working; Austenitic stainless steels: Metal working; Titanium: Metal working; Copper: Metal working; Brasses: Metal working; Aluminum base alloys: Metal working; Press forming; Formability
ALI 4090, 404 CCA: SSA; 70/30 CCA: CUBRA; 1100, 3004, 5005 CCA: AL
ET D; Ti; Cu; Al

L72 ANSWER 38 OF 45 METADEX COPYRIGHT 2002 CSA
AN 1981(9):14-390 METADEX
TI Isothermal Decomposition of Solid Solutions in a Ti - 2.5 Wt.-% Cu Alloy.
AU Pelletier, J.M.; Vigier, G.; Borrelly, R.; Merlin, J.
SO TMS/AIME. P.O. Box 430, 420 Commonwealth Dr., Warrendale, Pa. 15086. 1980. 1409-1417. Accession Number: 81(9):72-374
Conference: Titanium '80, Vol. 2, Kyoto, Japan, 19-23 May 1980
DT Conference
LA English
AB Thermoelectric power measurements were used to determine the kinetics of alpha and alpha ' solid solutions decomposition and the morphology of precipitate phases for Ti - 2.4% Cu alloy. Below 450 deg C a formation of coherent gamma @ precipitates is observed, while > 450 deg C semicoherent gamma ' precipitates nucleate on structural defects and then spread over the matrix. With cold working and duplex aging lambda ' precipitation is accelerated by the introduction of linear defects. After nucleation at low temp. some small gamma @ precipitates can be dissolved during aging at higher temp., but a complete reversion cannot be achieved; by contrast, some larger gamma @ precipitates grow quickly before gamma ' formation; the proportion of gamma @ dissolution depends on second aging temp. The thermoelectric power measurements appear to be a useful tool for the study of alloy decomposition and should be used more for T.T.P. diagram determination and in a general way for phase transformation study. 10 refs.-AA
CC 14 STRUCTURAL HARDENING
CT Titanium base alloys: Structural hardening; Phase decomposition; Precipitates; Aging; Thermoelectricity
ALI Ti-2.4Cu CCA: TI
ET Ti; Cu; Cu*Ti; Cu sy 2; sy 2; Ti sy 2; Ti-2.4Cu; I*T; TI; T cp; cp; I cp

L72 ANSWER 39 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1980:80866 HCAPLUS
DN 92:80866
TI Nitridation of **titanium**
IN Muroi, Katsumi; Nakae, Hideo
PA Hitachi, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 2 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC C01B021-06
CC 56-5 (**Nonferrous** Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 54093700	A2	19790724	JP 1978-230	19780106

AB **Ti** is nitrided in an NH3 or N-H atm. and heated at .gtoreq.600.degree. in an inert gas atm. or vacuum. The resulting **Ti** hydride is decompd. by heating. The process is superior to that involving high-purity N. Thus, **Ti** rod was nitrided 4 h at 800.degree. in flowing NH3, heated 1h at 700.degree. and 10-4, and cooled. The Charpy V-notch **impact** strength was almost equal to the original value of 7.0 kg-m. The **Vickers hardness** was .apprx.350 and nitrided layer depth was 80 .mu., compared to .apprx.250 and 20 after nitriding 40 h in N.
ST **titanium** nitriding ammonia atm
IT Nitridation
(of **titanium**, ammonia atm. for improved)
IT 7664-41-7, uses and miscellaneous
RL: USES (Uses)
(nitriding of **titanium** in atm. of)
IT **7440-32-6**, properties
RL: RCT (Reactant)
(nitriding of, ammonia atm. for improved)
IT **7440-32-6**, properties
RL: RCT (Reactant)
(nitriding of, ammonia atm. for improved)
RN 7440-32-6 HCAPLUS
CN Titanium (8CI, 9CI) (CA INDEX NAME)

Ti

L72 ANSWER 40 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1978:26361 HCAPLUS
DN 88:26361
TI Structure and properties of a titanium-molybdenum composite material produced by explosive welding
AU Antsiferov, V. N.; Deribas, A. A.; Yakovlev, I. V.; Lyudagovskii, A. V.; Rabinovich, A. I.
CS Inst. Gidrodin., Novosibirsk, USSR
SO Fiz. Goreniya Vzryva (1977), 13(5), 767-71
CODEN: FGVZA7
DT Journal
LA Russian
CC 56-3 (Nonferrous Metals and Alloys)
AB The structure and properties were investigated of a composite material obtained by explosive welding of Ti VT1-0 (0.1 mm thick foil, strength

45-60 kg/mm2, elongation 10-8%) to Mo fibers with strength of 160-90 kg/mm2 and elongation 5-10%. At the fiber-matrix interface there were segments of a white zone extending along the length of welded sheets. The av. depth of the zone was 20-5.mu.. The zones not assocd. with Mo fibers had **Vickers hardness** (**HV**) 290, which corresponded to the hardness of Ti matrix, whereas the regions adjacent to the fibers had **HV** 710 at fiber **HV** of 545. The areas with **HV** 710 had a component ratio Ti/Mo of 1.5-1.8. In areas with **HV** 400 the Ti/Mo ratio was 4.5-7.0. In the specimens annealed at .ltoreq.750.degree., the fibers broke in groups, and at 930.degree. the fibers broke simultaneously. The strength of the composite on the av. was 115 .mu.g/mm2.

ST titanium composite molybdenum fiber; explosive compaction fiber composite
IT Explosion
(welding by, of titanium foil to molybdenum fiber for composites)
IT Welding
(explosive, of titanium foil to molybdenum fiber for composites)
IT **39462-06-1**
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(explosive welding of, to molybdenum fiber for composites)
IT 7439-98-7, properties
RL: PRP (Properties)
(fiber, explosive welding to titanium foil, for composites)
IT **39462-06-1**
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(explosive welding of, to molybdenum fiber for composites)
RN 39462-06-1 HCAPLUS
CN Titanium alloy, base, Ti 99.4-100,Fe 0-0.30,O 0-0.25,C 0-0.10,N 0-0.03,H 0-0.015 (UNS R50400) (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99.4 - 100	7440-32-6
Fe	0 - 0.30	7439-89-6
O	0 - 0.25	17778-80-2
C	0 - 0.10	7440-44-0
N	0 - 0.03	17778-88-0
H	0 - 0.015	12385-13-6

L72 ANSWER 41 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1975:20845 HCAPLUS
DN 82:20845
TI **Titanium** boride sinter
IN Tanaka, Hiroshi
PA NGK Spark Plug Co., Ltd.
SO Japan. Kokai, 2 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
NCL 20(3)C24
CC 56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 49085115	A2	19740815	JP 1972-125430	19721213

AB Sintered TiB_2 having improved hardness, **impact resistance**, and corrosion **resistance**, esp. to molten Al, is made by adding 1-5 wt.% WC and hot-presssing. Thus, a powd. 6:4 WC-Co

mixt. was pelletized to spherical form, sintered at 1450.degree. for 1 hr, and ball milled with acetone and TiB2 for 40 hr. Then, the TiB2 mixt. contg. 4.68 wt. % hard alloy was dried and press-molded in a graphite mold at 1800.degree. and 150 kg/cm2. The product had **Vickers hardness** 2900 and bending strength 50 kg/mm2.

ST **titanium** boride sintering; corrosion resistant **titanium** boride sinter; **impact resistant titanium** boride sinter

IT 55014-20-5
RL: USES (Uses)
(**impact-resistant**, hard, corrosion **resistant** to molten aluminum, from powder by hot pressing)

L72 ANSWER 42 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1972:491987 HCAPLUS
DN 77:91987
TI Use of titanium alloys containing 0.1-2% copper for manufacturing semi-finished products
IN Tricot, Roland; Seraphin, Leon
PA Ugine Kuhlmann
SO Ger., 2 pp.
CODEN: GWXXAW
DT Patent
LA German
IC C22C
CC 56-2 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 2031899		19720622		
PRAI	FR 1969-21943		19690630		

AB A soft annealed Ti alloy contg. 0.1-2% Cu having good cold workability is provided for use as rivets, cold drawn sheets, wires and pipes. The alloy can also contain as impurity C .ltoreq.0.1, N .ltoreq.0.05, H .ltoreq.0.0125, O 0.070-0.090, and Fe .ltoreq.0.05%. Thus, a Ti alloy contg. Cu 0.6, C 0.012, O 0.080, N 0.012, Fe 0.028, H 21 ppm, and the balance Ti was melted in a vacuum furnace. From this alloy a wire of 5.5 mm diam. was made for rivets and the wire was then annealed for 1 hr at 800.degree.. The annealed wire had a tensile strength of 56.4 kg/mm2, a shearing strength of 40.4 kg/mm2, and **Vickers hardness** of 188.6. In comparison, a conventional Ni alloy used for the same purpose and contg. 31% Ni had a tensile strength of 50.6 kg/mm2, a shearing strength of 35.7 kg/mm2, and a **Vickers hardness** of 118.

ST titanium alloy semifinished; copper titanium alloy semifinished; drawing titanium alloy

IT Rivets
(copper-titanium alloys for)

IT **37268-35-2**
RL: DEV (Device component use); USES (Uses)
(for rivets)

IT **37268-35-2**
RL: DEV (Device component use); USES (Uses)
(for rivets)

RN 37268-35-2 HCAPLUS
CN Titanium alloy, base, Ti 99,Cu 0.6-1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number

Ti	99	7440-32-6
Cu	0.6 - 1	7440-50-8

L72 ANSWER 43 OF 45 HCAPLUS COPYRIGHT 2002 ACS
AN 1972:75810 HCAPLUS
DN 76:75810
TI Cold-deformable titanium alloy
IN Tricot, Roland; Seraphin, Leon
PA Ugine Kuhlmann
SO Fr. Demande, 3 pp.
CODEN: FRXXBL
DT Patent
LA French
IC C22C; B64C
CC 56 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 2052920	A5	19710416	FR 1969-21943	19690630
	GB 1304572	A	19730124	GB 1970-24926	19700523
PRAI	FR 1969-21943		19690630		

AB A Ti-Cu alloy, esp. useful for manufg. rivets, contains 0.1-2 wt. % Cu and the following max. amts. of impurities: C .ltoreq.0.1, N .ltoreq.0.05, H .ltoreq.0.0125, O .ltoreq.0.1, Fe .ltoreq.0.05, and others <0.05 wt. %. The shear strength at normal temp. of the alloy is >34 hbars and the **Vickers hardness** under 10 kg is <170.
ST cold deformable titanium alloy; copper titanium deformable alloy
IT Rivets
(titanium-copper alloys for)
IT **12637-21-7 12644-44-9**
RL: USES (Uses)
(for rivet)
IT **12637-21-7 12644-44-9**
RL: USES (Uses)
(for rivet)
RN 12637-21-7 HCAPLUS
CN Titanium alloy, base, Ti 99,Cu 1.1,O 0.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
Cu	1.1	7440-50-8
O	0.1	17778-80-2

RN 12644-44-9 HCAPLUS
CN Titanium alloy, base, Ti 99,Cu 0.6,O 0.1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ti	99	7440-32-6
Cu	0.6	7440-50-8
O	0.1	17778-80-2

L72 ANSWER 44 OF 45 JAPIO COPYRIGHT 2002 JPO
AN 2002-061717 JAPIO
TI CHAIN FOR CORROSIVE ATMOSPHERE

IN SATO RYUKICHI; TANAKA SHINICHI
PA ENUMA CHAIN SEISAKUSHO:KK
TANAKA:KK
PI JP 2002061717 A 20020228 Heisei
AI JP 2000-247402 (JP2000247402 Heisei) 20000817
PRAI JP 2000-247402 20000817
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2002
IC ICM F16G013-02
ICS C23C008-36; C23F015-00; F16G013-06
ICA **C22C014-00**
AB PROBLEM TO BE SOLVED: To realize high-degree durability in a corrosive atmosphere.
SOLUTION: Inner link plates 11 and 11, outer link plates 12 and 12, a bush 13, a connecting pin 14 and a roller 15 are respectively formed of **titanium metal**, and plasma carburizing treatment is applied. A carburized layer having **Vickers** hardness not less than 400 and the layer thickness not less than 20 μm can reveal a small surface friction coefficient and excellent abrasion resistance.

L72 ANSWER 45 OF 45 JAPIO COPYRIGHT 2002 JPO
AN 2001-262257 JAPIO
TI **TITANIUM** EXCELLENT IN **IMPACT RESISTANCE** AND ITS PRODUCING METHOD

applicants

IN TAKAHASHI KAZUHIRO; MASAKI MOTOMI; MIURA KAZUYUKI; OYA TATSUO
PA NIPPON STEEL CORP
NIPPON MIC KK
PI JP 2001262257 A 20010926 Heisei
AI JP 2000-74405 (JP2000074405 Heisei) 20000316
PRAI JP 2000-74405 20000316
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
IC ICM **C22C014-00**
ICS **B21D001-05; C22F001-18**
ICA **C22F001-00**
AB PROBLEM TO BE SOLVED: To produce inexpensive **titanium** excellent in **impact resistance** and to provide its producing method.
SOLUTION: The concentrations of O, N, C and Fe are controlled to prescribed ranges without adding alloy elements such as Al, Mo and V to secure cold workability, and on the other hand, the **Vickers hardness** of the cross section of a **titanium** formed product in a state of being work-hardened in the combination of preliminary working and annealing performed before forming into a **titanium** formed product or in the process thereof is controlled to a prescribed range in accordance with the componential concentrations thereof, by which a **titanium** formed product excellent in **impact resistance** is obtained.